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M. W. Baldwin, ***Manufacturer of Locomotive Steam Engines, Stationery Engines, Steamboat Engines, Railroad Machinery, Sugar Mills, &c. &c., Broad Street, Philadelphia.***

References to the following Companies, where the annexed Nos. of his Engines are in use:

	Nos. of Engines.	
Columbia and Philadelphia State Road,	24	
Harrisburgh and Lancaster	Pa. 6	
Little Schuylkill,	" 2	
Cumberland Valley,	" 1	
Philadelphia and Reading,	" 1	
Phila., Germantown, and Norristown,	" 4	
Boston and Providence,	Mass. 3	
Boston and Worcester,	" 2	
Utica and Schenectady,	N. Y. 12	
Rensellaer and Saratoga,	" 2	
Long Island,	" 2	
Rochester and Tonawanda,	" 2	
Clinton and Port Hudson,	Lou. 2	
Island of Cuba,	2	
Madison and Indianapolis,	Ind. 1	
N. Cross Road,	Illinois 1	
	67	

	Nos. of Engines.
Philadelphia and Trenton,	N. J. 4
New-Jersey Transportation Co.	" 5
Morris and Essex,	" 1
Philadelphia, Wilmington and Baltimore,	4
Charleston and Hamburg,	S. C. 4
Central Road, Savannah,	Geo. 2
Augusta Railroad,	" 6
Monroe Railroad,	" 1
Commercial Railroad, Vicksburg,	Miss. 3
West Feliciana,	" 1
Mobile and Cedar Point,	Ala. 1
Tuscumbia and Decatur,	" 1
Detroit and Ypsilanti,	Mich. 2
Adrian and Toledo,	" 2
Lake Wimico and St. Joseph's	Florida. 2
	50

From the annexed testimonials, it will be seen that the Engines of M. W. B., are not inferior in capacity of performance to any Engines in this, or any other country; while at the same time they combine several improvements secured by patent, and many advantages not to be found in other Engines.

One very important advantage is, the simplicity of their construction and arrangement, by which every part of the machinery is perfectly accessible while the engine stands upon the road.

The improvement in the construction of the cranks is one of *great importance*, obviating the liability to break,—an occurrence so common to most locomotive engines.

Another great advantage arises from having the fire-box before the driving wheels, thus making an equal distribution of weight, which wholly corrects the galloping or undulating motion peculiar to both 4 and 6 wheel engines, with the fire-box behind the driving shaft, making them more easy upon the road than any engines of the same capacity now in use; while, by the very simple device of throwing a portion of the weight of the tender upon the driving wheels, or detaching it at pleasure, the engine is made to possess the advantage of a light, with the adhesion of a heavy engine upon the ascents where increased adhesion is required.

In order to test their comparative merits, when used on the same roads with other engines, he suggests that a regular account be kept, of expenses of repairs, distance travelled, and work performed by each engine; which will furnish the only correct data by which to judge of their respective merits, which cannot be correctly done by a few experiments made for the purpose of effect.

M. W. B. manufactures three classes of Engines, Nos. 1, 2, and 3. Most of the above engines belong to the 3d, or smaller class, and many of them have been in use from two to four years. His present engines are very much improved. One of the first class, recently built, has drawn over the Columbia road, part of which has an ascending grade of 45 feet per mile, 35 loaded cars weighing 187 tons, equal to about 700 tons on a level.

Orders for engines or machinery promptly executed, on application to M. W. BALDWIN, Philadelphia, or to E. L. MILLER, his agent, for contracts in the city of New York.

The following testimonials of the merits of these engines have been received from Officers, Engineers, and Superintendents of motive power, &c. &c. of several of the roads above referred to.

Mr. JOHN BRANDT, Superintendent of Engines and Machinery, on the Columbia and Philadelphia Railroad, writes under date of the 11th of May, 1838:—"We have twenty-four of your engines, several of which have been in use since the fall of 1834. Two of your 3d class engines commenced running Feb. 22d, 1837, and travelled 55,665 miles, up to the 1st of May, 1838, and cost for repairs during the above-mentioned time, one cent and eight mills per mile. Eight engines of the first class, have travelled from the 1st of January, 1838, to the 1st of May, (4 months) 46,569 miles, made 653 trips, drawing 16,836 cars; the cost per mile for these four months, I am now unable to show, as our books are not posted, but can assure you that the expenses this year will be less per mile than any former years. One of the first class recently built, has drawn over the Columbia road, part of which has an ascending grade of 45 feet per mile, 35 loaded cars, weighing 187 tons, equal to about 700 tons on a level, and travelled from 8 to 12 miles per hour, except on the wooden track. This is the heaviest train that has ever passed over the road."

JAMES T. SHIPMAN, Resident Engineer of the Long Island Railroad Company, writes, May 21st, 1838: "We have two engines of class No. 3, of your manufacture, which have been in use since May, 1836. Their performance is worthy of the most unqualified praise. We carry as an ordinary load, 15 freight cars, weighing 54 tons each; and to show their efficiency, we have frequently taken 20 cars without difficulty, up an ascent of 35 feet to the mile; and have carried 4 cars up a grade of 211 feet per mile for a distance of 2,100 feet. The average speed for freight is 10 miles, and for passengers, from 20 to 25 miles per hour. In the summer of 1837, they performed the distance of 162 miles each day, and from the journal which now lies before me, it appears that under this severe usage, there was no failure in either of these engines for 6 months, which rendered a change in their usual time of running necessary, or caused any delay, either in the transportation of passengers or freight. I am fully satisfied that the cost of repairs does not exceed one half that of a four wheel engine doing the same work."

Mr. JOHN CASH, superintendent of motive power, on the Norristown Railroad, says under date of May, 1838: "I take great pleasure in bearing testimony to the excellence of your engines. They are well adapted to light or heavy loads. With one of the small class which has been nearly three years in constant service, I have drawn a train of 750 passengers, over grades of 32 feet per mile, at the rate of 14 miles per hour."

Mr. J. ELLIOT, Superintendent of Motive power, on the Philadelphia, Wilmington and Baltimore Railroad, writes: "After an experience of several years with Locomotive engines on different roads, I am of opinion that the engines of M. W. Baldwin, are easier upon the road than any engines in use, and that they combine more advantages than any locomotives within my knowledge. They have been almost constantly running for the last eighteen months. The engine Brandywine, has been running 265 days, at a cost for repairs of $65 17, and has lost but 5 days since she was put on the road. The Christiana has been running 135 days at a cost of but $20 for repairs. Their average speed is 24 miles per hour, including stoppages."

J. G. CANNON, President, and L. R. SARGENT, superintendent of the Rensselaer and Saratoga Railroad Company, say under date of 29th of May, 1838: "We have two of your locomotives which have been in use about three years. They *work well* in every particular; and I deem it but an act of justice to say that the manufacture and materials of each have proved to be of the highest order, and I have evidence from the official reports of other companies, and my own experience here, that your engines will, in *performance* and *cost of repairs*, bear comparison with any engines made in this, or any other country."

W. W. WOOLSEY, Esq. President of the Boston and Providence Railroad Company, writes on the 31st of May, 1838: "We have three of your Engines, which have been in use since about June, 1836. We have never had occasion to put them to their maximum capacity. They have carried 17 freight cars of gross weight, say 85 tons, engine and tender not included, over the road at an average speed of 10 miles per hour, including an ascent of 2 miles in length, one half mile of which is 42½ feet per mile, and the remaining four and a half miles, 37½ feet per mile. They carry ten passenger, and three baggage cars, regularly over the road, at an average speed of 18 or 20 miles per hour. Your engines give entire satisfaction."

From WM. C. YOUNG, Superintendent and Engineer of the Utica and Schenectady Railroad, May 22d, 1838: "The twelve locomotive engines procured of you for the Utica

and Schenectady Railroad have answered their purposes effectively. Notwithstanding much has been said about improvements in such machines, I have not been able to satisfy myself that ours are wanting in any particular."

J. Edgar Thomson, Chief Engineer, and General Agent of the Georgia R. R. & B. Co. writes July, 1838: "We have in operation on the Georgia Railroad, six locomotives from Mr. Baldwin's factory, all of which have given the entire satisfaction. The simplicity of their construction, and the excellent proportions and arrangement of the various parts of the machinery, entitle them in my opinion, to a decided preference over any other engines that I have examined, either of European, or domestic manufacture."

H. R. Campbell, Esq. Civil Engineer of Philadelphia, writes: "One of your third class Engines (the West Chester) this morning, (June 8th) drew a train of *fifty-one* loaded cars, from Schuylkill Bridge to Broad street, (4 miles) passing several abrupt caves, some of 757 feet radius, and several ascending grades, one of which is 32 feet per mile. The weight which I got from the weighmaster of the road, for my own satisfaction, was 284½ tons exclusive of the Engine. It exceeds any experiment I ever heard of in any part of the world, and was apparently made without any preparation, for no one was present to witness it, but the hands on the road and myself, who was casually passing."

L. A. Sykes, Esq., Superintending Engineer of the New-Jersey Railroad, says under date of June 12th, 1838: "We have five of Mr. Baldwin's third class Engines on our road, which have been in use from one to two and a half years, and have performed to our entire satisfaction. Our first Engine was put upon the road in December, 1835; it has been in constant use with the exception of a very few days; is now in perfect order, and apparently as good as ever. In simplicity of construction, small liability to get out of order, economy of repairs, and ease to the road, I fully believe that Mr. Baldwin's Engines stand unrivalled. I consider the simplicity of the Engine, the arrangement of the working parts, and the distribution of the weight, far superior to any thing I have ever seen, either of American or English manufacture, and I have now no hesitation in saying, that Baldwin's Engines will do the same amount of work, with much less repairs, either to the Engine *or the track*, than any other engines now in use."

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WILLIAM P. ELLIOTT, Artist, for many years employed in the *Patent Office*, will devote a portion of his time to the preparation of papers and drawings for applicants for Patents, and attend to the procuring of patents for useful inventions without the necessity of a journey to Washington; and will give information by *mail*, as to the originality of the same, previous to applying for patents.

☞ All communications must be free of postage. His Office is in room No. 10. Patent Office Buildings, Washington, D. C.

Washington, *April* 23, 1838. Jy1—3t

☞ We ask the attention of our readers to the following notice of the Chief Engineer of the James River and Kanawha company

NOTICE TO CONTRACTORS.

James' River and Kanawha Improvement—Virginia.

A public letting will be held in the town of Lynchburg, on the 12th September next, of all the work not now under contract, on the line of the canal between that place and the city of Richmond.

This work consists of 39 locks, 43 culverts, 3 aqueducts, 2 towing path bridges, (one of which is across James' river,) about 120 farm and road bridges, and from 30 to 40 sections, besides several heavy sections between Lynchburg and the Blue Ridge.

The locks will generally be of dry masonry sheathed with plank.

The situation of the work will be pointed out to contractors by the assistant engineers on the line; and the general plans and specifications will be exhibited at the office of the subscriber, in the city of Richmond, until the 9th of September and in Lynchburg at the time of the letting.

The valley of the James River is remarkably healthy.

CHARLES ELLET, Jr.
Chief Engineer of the J. R. and K. Company. 8 ta8

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Remarks on the Velocity of Steam Vessels.

To the Editors of the Railroad Journal.

Barnwell District, South Carolina, July 1, 1837.

GENTLEMEN:—In Renwick's Treatise on the Steam Engine, page 264, I find the following statements:—

"To determine the velocity that a given engine will give to a vessel, and the conditions under which it may produce a maximum of effect, is evidently a problem of great complexity. We do not conceive that it has ever been solved in a manner perfectly satisfactory either in theory or practice."

"Even the simplest point concerned in the investigation, namely, the velocity of the wheel through the water, at which a maximum effect would be produced, does not appear to have been solved."

The author then goes on to state that the velocity of the wheel should be to that of the water as 4 to 3, and cites the theorem of Parent. At page 268, alluding to the steamboat North America, he says—"The relation between the velocities of the boat and the wheel is as 3 to 4, or identical with that chosen by us as the most advantageous." And at page 275 he gives this practical rule—"The relative velocity of the circumference of the wheel, should be, in all cases, six and a half feet per second."

As these rules appear to be at variance with each other, and are given without demonstration, I have been induced to offer you the following theory.

A boat in motion is resisted by the water, by the air, and by gravity on the inclined plane of a rapid current. If we denote the area of the immersed parts of the midship section of the vessel in square feet, by b, and the velocity of the boat through the water, by v, then the resistance of the water to the motion may be expressed by $b\,h\,v^m$, in which h is a co-efficient to be determined by experiment. If the velocity of the current be represented by r, the absolute velocity of the boat will be $v \pm r$; also, if the velocity of wind, either in favor or opposition of the motion, be w, then the motion of the boat through the air will be $v \pm r \pm w$, and the resistance of the air will be $\pm c\,k\,(v \pm r \pm w)^m$, in which c is the area of the surfaces exposed to the action of the air; and if the total weight of the boat in pounds be M, and the inclination of the plane i, the resistance from this cause will be expressed by $\pm$ M sine i. The total resistance to motion of the boat will, therefore, be $b\,h\,v^m \pm c\,k\,(v \pm r \pm w)^m \pm$M sin. i.

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Let, now, the rotary velocity of the paddle be represented by V, and it will strike the water with the velocity $V-v$; and if a denote the area of paddle, the resistance of the water to the motion of the paddle will be $af(V-v)^m$. But it is a known principle in mechanics, that for a body to be in a state of uniform motion, the accelerating force must be equal to the resistance. The reaction of the water against the wheels must, therefore, be equal to the resistance of the boat; which gives us this equation:

$$af(V-v)^m = bhv^m \pm ck(v \pm r \pm w)^m \pm M \sin i \ldots\ldots\ldots\ldots (I)$$

which solved for V, gives:

$$V = v + \sqrt[m]{\left\{ \frac{bh}{af} v^m \pm \frac{ck}{af}(v \pm r \pm w)^m \pm \frac{M \sin i}{af} \right\}} \ldots\ldots (II)$$

But the power required is evidently equal to the resistance on the wheels multiplied by their velocity, that is $Q =$ resistance $\times V$, substituting for V its value in equation (II), and for the resistance the second member of equation (I), and we obtain

$$Q = bhv^{m+1} \pm ckv(v \pm r \pm w)^m \pm Mv \sin i + \sqrt[m]{\left\{ \frac{bhv^m \pm ck(v \pm r \pm w)^m \pm M \sin i)^{m+1}}{af} \right\}} \ldots\ldots\ldots (III)$$

By far the most useful case of this equation is that in which the resistance of the air and the slope of the current are not considered. In this case the equations become—

$$af(V-v)^m = bhv^m \ldots\ldots\ldots\ldots\ldots\ldots (IV)$$

$$V = v\left(1 + \sqrt[m]{\frac{bh}{af}}\right) \ldots\ldots\ldots\ldots\ldots\ldots (V)$$

$$Q = bhv^{m+1}\left(1 + \sqrt[m]{\frac{bh}{ap}}\right) \ldots\ldots\ldots\ldots\ldots (VI)$$

from which last,

$$v = \sqrt[m+1]{\frac{Q}{bh\left(1 + \sqrt[m]{\frac{bh}{af}}\right)}} \ldots\ldots\ldots\ldots\ldots (VII)$$

In equations (III) and (VI) we see that a occurs only in the denominator which shows that *the greater the area of the paddle the less the power required.* If $a = o$ the power becomes infinite; while if a be made infinite, equation (VI) reduces to $Q = bhv^{m+1}$; and equations (II) and (V) to $V = v$. This would be the case if the wheels wound up two ropes extending down the river.

The power of a steam engine is not constant but varies with the velocity of its piston, and as the velocity of the piston varies with that of the wheel, our power Q will also vary with the velocity of the boat, and this renders an additional investigation necessary. We shall first proceed to find the maximum velocity of a boat with a given cylinder and pressure of steam.

Representing the total pressure of the steam in pounds per square foot, by s and the pressure of the atmosphere, or the vapor in the condenser, according as the engine condenses or not, by e, and the effective pressure will be $s-e$. The friction of the engine will be proportional to the pressure on the rubbing parts, or as $s-e$, and may be expressed by $Z(s-e)$, and

the available power will be $(s-e)(1-Z)$, which we may write $z(s-e)$. The area of the cylinder whose diameter is d, is $\frac{\pi}{4}d^2$, and consequently the effective force on the piston will be $\frac{\pi}{4}d^2 z(s-e)$. This force in its application to the paddle is still further diminished in the ratio that the velocity of wheels has to that of the piston, *i. e.*, D being the diameter of the wheels, and l the length of the stroke, as πD to $2l$, the force on the wheel will then be $\frac{\pi}{4}d^2 z(s-e)\frac{2l}{\pi D}$ which is equal to $\frac{d^2 lz}{2D}(s-e)$; and for the motion to be uniform, this must be equal to the resistance of the wheel, which we have seen is equal to $b h v^m$; whence we have this equation $\frac{d^2 lz}{2D}(s-e) = b h v^m$, which gives:

$$v = \sqrt[m]{\left\{\frac{d^2 lz}{2Dbh}(s-e)\right\}} \quad \ldots\ldots\ldots\ldots\ldots\ldots\text{(VIII)}$$

This will be the velocity, supposing that the boiler can furnish the requisite quantity of steam, and that it can pass through the pipes with sufficient velocity. Let us see what is this quantity of steam. The velocity of the piston is $\frac{2l}{\pi D}V$; substituting for V its value from equation (V) and this becomes $\frac{2l}{\pi D}v\left(1+\sqrt[m]{\frac{bh}{af}}\right)$ this multiplied by the area of the piston, $\frac{\pi}{4}d^2$, gives for the volume of steam that must enter the cylinder, $\frac{d^2 l}{2D}v\left(1+\sqrt[m]{\frac{bh}{af}}\right) = Wy$; in which W is the quantity of water evaporated per second, and y the volume of the steam corresponding to the given pressure. By substituting for v its value from equation (VIII) this becomes—

$$Wy = \frac{d^2 l}{2D}\left(1+\sqrt[m]{\frac{bh}{af}}\right)\sqrt[m]{\left\{\frac{d^2 lz}{2Dbh}(s-e)\right\}} \quad \ldots\ldots\text{(IX)}$$

There is no necessity for the boiler to make more steam than this, for it cannot enter the cylinder, but must blow off by the safety valve.

But if the boiler should not furnish steam enough for this velocity, it will expand in the cylinder, which will diminish its pressure, and this diminished pressure must be used in the equation in place of s, to determine the true velocity. The pressure in the boiler will be to that in the cylinder as the volume used by the cylinder is to that furnished by the boiler, that is, as $\frac{d^2 l}{2D}v\left(1+\sqrt[m]{\frac{bh}{af}}\right) : Wy$. The pressure in cylinder will therefore be $\frac{2DWys}{d^2 lv\left(1+\sqrt[m]{\frac{bh}{af}}\right)}$ this substituted for s in equation (VIII) gives—

$$v = \sqrt[m]{\left\{\frac{d^2 lz}{2Dbh}\left(\frac{2DWys}{d^2 lv\left(1+\sqrt[m]{\frac{bh}{af}}\right)}-e\right)\right\}} = \sqrt[m]{\left\{\frac{Wyzs}{bhv\left(1+\sqrt[m]{\frac{bh}{af}}\right)}\right.}$$

$$\left.-\frac{d^2 lze}{2Dbh}\right\} \text{ from which } v^{m+1}+\frac{d^2 lze}{2Dbh}v = \frac{Wyzs}{bh\left(1+\sqrt[m]{\frac{bh}{af}}\right)} \quad \ldots\text{(X)}$$

An equation which when solved for v will give the velocity, subject however to the condition above-mentioned, that W y must not be greater than

$$\frac{d^2\,l}{2\,D}\left(1+\sqrt[m]{\frac{bh}{af}}\right)\sqrt[m]{\left\{\frac{d^2\,l\,z}{2D\,bh}(s-e)\right\}}$$

Q is expressed in pounds raised one foot per second, and as a horse power is 33,000 lbs. raised one foot per minute; to get the value of Q, we must multiply the horse power of the engine by 550.

If the resistance of the water be as the square of the velocity, $m = 2$ and by equation (VI) Q will be as the cube of the velocity, but Q is the power expended in the unit of time, the total power in any time t will be t Q. But the time of performing a given distance s through the water is $\frac{s}{v}$, which gives $t\,Q = \frac{s}{v}Q$, but as Q is as the cube of the velocity, the expenditure of power will be as $\frac{s}{v}v^3$, or as sv^2, as the square of the velocity. In ascending against a current whose velocity is r, the time required to ascend a given distance, is $\frac{s}{v-r}$ which makes the power tQ be as $s\frac{v^3}{v-r}$ which is easily shown to be a minimum when $v = \frac{3}{2}r$, but as the boat will steam in the downward trip, the time of ascending and descending will be $\frac{s}{v-r}+\frac{s}{v+r} = 2s\frac{v}{v^2-r^2}$, and the power will be as $2s\frac{v^4}{v^2-r^2}$ which is a minimum when $v = r\sqrt{2}$.

We have spoken of the velocity of the paddle, when in reality every part moves with a different velocity, for the outer edge evidently moves faster than the inner, which is nearer to the centre, but a certain point can be found whose velocity is such that if the whole paddle moved with that velocity, the action would be the same as that of the actual paddle; we propose to call this point the centre of resistance, as we do not find that it has been taken notice of by writers.

If we represent the velocity of the outer edge of the paddle by y, the distance of any point from the axis by z, and the radius of the wheel by a, the velocity of the point z will be $y\frac{z}{a}$, and the point z will strike the water with the velocity $y\frac{z}{a} - v$, which by making $n = \frac{v}{y}$, may be written $y\left[\frac{z}{a}-n\right]$. The action of any element of the paddle $d\,z$ will therefore be, as $\left[\frac{z}{a}-n\right]^2 d\,z$, and the whole action of the paddle will be $F\left[\frac{z}{a}-n\right]^2 d\,z$, which between the limits $z = a-b$, and $z = a$ (in which b is depth of paddle, gives) $\frac{a}{3}\left\{(1-n)^3-\left[(1-n)-\frac{b}{a}\right]^3\right\}$ for the whole action of the paddle, which is equal to $(1-n)^2\,b-(1-n)\frac{b^2}{a}+\frac{b^3}{3\,a^2}$.

Now taking c for the distance of the centre of resistance from the axis, the velocity of that point will be $\frac{c}{a}y$, and if the whole paddle moved with that velocity the action would be as $b\left[\frac{c}{a}-n\right]^2$, whence, $b\left[\frac{c}{a}-n\right]^2$ $= (1-n)^2 b-(1-n)\frac{b^2}{a}+\frac{b^3}{3\,a^2}$, from which $c = a\,n+\sqrt{\left\{(1-n)^2\,a^2 - (1-n)\,a\,b+\frac{b^2}{3}\right.}$.

This equation will serve to find c, when the velocity of the circumference of the wheel y is known. Our equations (II) and (V) give the velocity V of the point c itself; in this case to find c, we must consider that the velocity of c, namely: V is to that of the circumference y as c to a, or $y = \frac{a}{c}$ V, and as $n = \frac{v}{y}$, $n = c\frac{v}{a\,\mathrm{V}} = c\,m$. By substituting this value of n in our equation for c, we shall find c by solving a quadratic. In all the equations the diameter of the wheel, D, must be taken as $2\,c$, not the actual diameter from out to out; it will generally be sufficiently near to measure from the middle of the paddles.

It is evident from equation (VIII) that if a boat working at full pressure in the cylinder, were to take three similar boats in tow, the velocity would be reduced to one-half, while from equation (VII), if the power of the engine remained constant, it would take seven other boats to reduce the velocity to one-half; the reason of this difference is, that in the first case a great part of the steam would escape, not being able to enter the cylinder, and from this it follows that a tow boat should never work at full pressure, or the steam will be wasted when most needed.

All our measures are given in feet, and the velocities in feet per second, also the pressures are expressed in pounds per square foot, and the water evaporated in cubic feet per second.

I have found that these equations answer, by making $f = 1{\cdot}943$; $h = {\cdot}108$, for a good model; $m = 2$; $k = {\cdot}002$; and $z = \frac{5}{6}$.

E. C. Bellinger.

(From the Journal of Commerce.)

The New Steam Boat Law.

We will go as far as any one in support of any *practicable* measure for the greater security of life on board of steamboats; while on the other hand it is evident, that any measure which only *seems* to promote that result, but does not in fact do so, is an injury both to steam-boat proprietors and the public. It is an injury to the former, inasmuch as it causes them trouble and expense; and to the latter, inasmuch as it begets, if trusted in, a misplaced confidence, which endangers life instead of protecting it.

In this light we regard the new Steam Boat law; at least that portion of it on which most people not conversant with the structure of steam-boats and machinery, will be apt to place their chief reliance. The provisions which require iron rods or chains instead of tiller ropes,—a suction hose and engine,—a suitable number of small boats,—and signal lights at night,—are reasonable and practicable.* So would have been a provision requiring each boat to be supplied with a number of life-preservers, equal to the usual number of passengers. But these are only incidentals. The prominent features of the bill are, 1. That which provides for a system of inspection; and 2. That which makes the proprietor of a steamboat responsible for all injuries which may occur to persons or property on board of the same, by reason of explosions or other

* Yet the phraseology indicates that the framers of the law were not much conversant with the subject upon which they were legislating. Do they mean that iron rods or chains shall extend to and pass around the wheel? That would be attended with great difficulty, to say the least. And as to signal lights, there are much better and more efficient regulations now in force in this part of the country, under State laws, than are required by the Act of Congress.

irregular escape of steam, unless he can *prove* "that no negligence has been committed by him or those in his employ."

In regard to the first of these provisions, we remark, that, however well it may look on paper, it will in practice *deceive* the public, instead of enlightening them. Who are to be the inspectors? Admitting that they will be, as the laws declare they shall be, "skilled and competent" men; we ask who is so skilled and competent, as by devoting $5 worth of his valuable time to a glance over the boiler and machinery of a steam-boat, to be able to judge of its strength and safety with *any thing like* the accuracy of the engineer, who has had it under his immediate inspection for months and years, and knows every inch of its surface, and every point of imperfection, if any exist, as well as man can know it? Again, what stranger is, or can be so deeply interested in having a safe boiler and sound machinery in any particular boat, as the engineer himself, who knows that in case of an explosion, or other disaster, he, from his position will be among the most certain victims. He has at stake not only his business, but his reputation, and his life. Who has more? Not surely the man who pockets his $5, and has no further interest in the result than his humanity may impart; for of course, if, after *his* inspection, the boat should blow up, it would be owing to the negligence, ignorance, or imprudence, of the engineer or his subordinates. One thing however, the inspectors may ascertain, and post up in some conspicuous place on board, to frighten or afford false confidence to the passengers; and that is, the *age of the boiler!* yes, and the *age of the boat* too!! Of all the ridiculous nonsense that ever was thought of to humbug the public, this the most arrant. Who does not know that the age of a boiler, or of a boat, is no test, nor scarcely any indication, of the strength and safety of either? Some boats are more seaworthy at the age of ten years than others at one; and the same is true of boilers. Why are not the inspectors required to post up also the fact whether the boilers are of iron or copper? In that case, how many poor creatures would be frightened out of their wits to find themselves on board of a boat with an iron boiler! while on the other hand, if they should read on the inspector's broad sheet that the boat had a copper boiler, they would throw away their life-preservers and sit on the safety valves. And yet, as a mattter of fact, the iron boiler is stronger and safer than the copper one. All the interests of the owners, engineers, firemen, and others, concerned in the running of a steamboat, are deeply involved in her safety. And yet they *may* err,—as was most disastrously illustrated in the case of Mr. G. B. Lamar, owner of the Pulaski, who entrusted himself and his whole family and much of his property on board of her on the voyage which was her last. Who that is human, is not liable to err? Is the $5 inspector the only exception?

Then as to damages in case of an explosion. The law makes the owners responsible for it all, whether of life or of property [what is the value, in dollars and cents of a life?] unless they can prove there has been no negligence. But, how can they expect to prove this? The engineer and firemen are probably dead, and there is no other being on earth who has any knowledge on the subject. Passengers may *guess* there has been negligence, as in the case of the Pulaski, and almost every other case of disaster,—for surely, if all was right, why should there be an explosion? The explosion itself is made by the law *prima facie* evidence of negligence; the few persons who, if living, could have disproved this false testimony, are dead; and the passengers, as usual, concur in the opinion that there *must have been* negligence. And so the owners, as innocent as the spot

less robes of light, and having used every reasonable and proper precaution to secure the safety of their passengers and crew, are mulcted in a sum equal to the full value of the property on board (sometimes half a million dollars) and also in the full value of all the lives lost, besides suffering the partial or total loss of their boat, and probably some of their near friends. And all this because they cannot disprove the *prima facie* evidence which the law arbitrarily establishes as real evidence, when it is on evidence at all. If this is not injustice, we should like to know what is.

The Act under consideration, besides being in the nature of an ex-post-facto law, affecting vast amounts of property invested under the idea that steam-boating was a lawful pursuit, is still further objectionable, inasmuch as it will have a tendency to drive responsible men out of the business, and throw it into the hands of adventurers. It will also operate as a formidable barrier to prevent any of the steamboats which are to ply between the United States and Europe, from being owned in this country, or bearing the American flag.

The law proceeds upon the following assumptions, which have been anything but proved :

1. That boilers and boats which have been some time in use, are much more liable to accidents than new ones.

2. That the Inspectors can have a better knowledge of the trustworthiness of a boat, boiler and machinery, and stronger motives to prevent disasters, than they who are immediately interested.

3. That the accidents which have occured hitherto, have arisen from the inattention and recklessness of those concerned, when the facts, so far as known at all, at least in regard to cases which have occurred in the Atlantic States, would show the contrary to be the fact, and the blame, if any, to lie in other quarters.

To us it appears obvious, that a thorough official investigation into the causes and circumstances of each accident, and the publication of all the facts and evidence elicited, which course has never yet been pursued, save in one or two instances, would do more to obviate the true cause of these disasters, than all the blindfold penal legislation that can be devised,—even if the rack and gibbet were to be superadded.

We heartily coincide, with a single exception, with the opinions expressed in the above article respecting the law in question. With regard to the inspection of boats and engines, we consider it a matter of moonshine, for no man can decide, with any chance of certainty, on the safety of a boat or engine, from such an inspection as he can afford to make for five dollars. Few men can be found capable of making the inspection at all, but many can be found in every place willing to accept of such an appointment as a sinecure. But whatever may be the talents or qualifications of the inspector, if he gives favorable certificates, and any disaster happens, ten chances to one, the owners, who perhaps may be models of innocence, are ruined. It has been held as a primary principle of law in our country, that every man is presumed innocent till proved guilty—but in this law the case is reversed. An accident happens, which perhaps no foresight could have avoided, by which lives are lost, perhaps every person on board—the owners, who are honestly serving and accom-

modating the public, are by this law at once declared manslaughterers; the burden of proof is shifted on them, and they must suffer accordingly, unless they can prove their innocence when the witnesses are every soul dead.

With respect to the chain, &c. we should say the writer manifests the same ignorance of the subject which he imputes to the legislators. If he were acquainted with practical mechanics, he would know that a chain is as applicable to a wheel, or pulley, as a rope.

Eastern Railroad Opening.

We copy the annexed notice of the opening of the Eastern Railroad from the Yankee Farmer, of Saturday. It adds another important link to the "great Atlantic chain," upon which we have so long labored.

"Agreeably to previous notice the Eastern Railroad was opened as far as Salem, on Monday last, Aug. 27. In the morning the cars started from Salem with the proprietors and invited guests from that place, and arrived in Boston at about half past 12 o'clock, P. M. The cars started on their return with the addition of other proprietors and invited guests, numbering upwards of 500, and arrived at Salem, stopping at Lynn, at about half past 1 o'clock, P. M. Owing to the crowded state of the cars both from Salem and Boston, the stockholders from Lynn could not be accommodated, and a separate train of cars was despatched from Salem for them.

"On the arrival of the train from Lynn, the company, numbering nearly 1000, formed in procession and proceeded to the depot, where a collation was provided in a building nearly two hundred feet in length, and sufficiently wide to accommodate four tables. The Hon. L. Salstonstall, Mayor of Salem, presided, and after the eatables were duly disposed of, made a brief address, stating the history of the enterprise and some of the circumstances attending its completion hitherto. He gave as a toast—

"'The city of Boston; the chief ornament of New England. The patriotic spirit of her inhabitants placed her on that eminence she now occupies to the honor of the whole country. It is the wish of every citizen of the State that her welfare may continue undiminished, and her prosperity go on increasing.'

"Excellent speeches were made by Mr. Speaker Winthrop, Mr. Attorney-General Austin, Mr. Peabody, President of the Corporation, Mr. Duncan of New-Orleans, Mr. Girard of New-York, Mr. Phillips, of Salem, Messrs. Park and Degrand of Boston, and several other gentlemen who addressed the company on the occasion, but we must confine ourselves to a few of the sentiments offered and drank with great applause.

"The Rev. Dr. Flint being called on, offered—

"'Railroads—the strong clamps which are destined to bind together with ribs of steel the whole of this great country; may they be multiplied and extended till they shall have cemented this Union beyond the possibility of severance.'

"By Mr. Peabody—'The old State of Massachusetts; a noble monument of what may be done by industry and enterprise. If her soil refuses to produce good crops, it yields a plentiful harvest of good men.'

"By Mr. Park—The act of incorporation of the Eastern railroad is a misnomer. It should rather have been called 'an act to repeal an act declaring Massachusetts and Maine to be separate and independent States.'"

First Annual Report of the President and Engineer-in-Chief of the Central Railroad and Banking Company of Georgia. L. O. REYNOLDS, Chief Engineer.

Engineer Department, Central Railroad, Savannah, May 10, 1838.

To WM. W. GORDON, President:

SIR—It is one year since the charge of the operations of this department was committed to me, and I now have the honor to present you a report of the same.

It is proper that I should first state the progress that had been made, and the condition of the work at the time it was placed under my direction.

In the summer and fall of 1834, an experimental survey was made under the direction of Col. CRUGER, at the request and cost of the City of Savannah, to ascertain the practicability, and approximately the cost, of constructing a Rail Road from this City to Macon. This survey demonstrated the practicability, and at a moderate cost, of what we have since denominated the "Northern Route." A full report has been published, with which you and the public generally are well acquainted.

In April 1836, this Company was organized, and preparations made for commencing operations without delay. A Chief Engineer was appointed, and under his orders a more minute and careful examination of the "Northern Route" was commenced at Macon on the 15th of September of that year, by a party under my direction. The Board of Directors, as well as the Stockholders, were by a large majority in favor of this Route, in preference to one further South, provided it could be pursued without too great a sacrifice of distance and expense.

The general features of the Route of this second survey, were similar to the first, with such variations as a knowledge of the country, gathered from the first examination suggested.

Commencing at the Court-House in the City of Macon, the water table of which was assumed to be 386 feet above Tide water, a line of levels and a survey of courses and distances, were carried immediately across the river Ocmulgee, then bending to the right, passed along its margin, alternately cutting off projecting points of the high land, and crossing occasional arms of the river swamp, until the valley of Stone Creek was reached, about 7 miles from Macon—here the line deflects suddenly to the left, and enters that valley, which was examined to the point in the summit ridge, where Col. CRUGER's line crossed, at the plantation of Mr. CHAPPELL. It was found that with a maximum slope of 21 $\frac{12}{100}$ feet per mile, which was prescribed by the Chief Engineer, a cut of 70 feet would be required to pass this point. A survey was then commenced, and continued along the summit of the ridge dividing the waters of the Ocmulgee, and those of the Oconee, in a northerly direction of 13 miles, with a view of ascertaining with certainty, the lowest depression in that ridge, which would be available for the passage of the road.

This ridge is well defined, and in its general direction is parallel to the Ocmulgee, and at a mean distance of about 9 miles from that River —the average height being about 580 feet above the valley. The ridge survey was terminated in Jones County, on the public road from Macon to Milledgeville, about 1 mile East of the point where the road branches to Clinton.

At this place the head branches of Walnut Creek, which empties itself

into the Ocmulgee near Macon, on the one hand, and of Commissioners' Creek which discharges into the Oconee on the other—approach within a few yards of each other, offering to the eye a favourable pass for our Rail Road, as well as a favourable route to descend on either side of the ridge.

An experimental line was commenced at this point, which was found to be 619 feet above tide—and continued down the branches of Walnut Creek towards the Ocmulgee, for a distance of 6 miles: in this distance the descent of the valley had so far exceeded our maximum rate, as to render the prospect of finding a route without exceeding 21 feet per mile, hopeless; this line was therefore abandoned.

The lowest depression found in the ridge, is about 5 miles North of the summit at CHAPPELL'S, and 40 feet lower, being 530 feet above tide. At this place the head branches of Stone Creek on the West, and Big Sandy Creek on the East are separated only by a sharp mound of about 1000 feet in width, requiring to be reduced about 37 feet at the highest point; the material being a compact argilaceous sand, which generally prevails throughout the pine barrens. A line was then run down this branch and connected with our first survey at Davis' Mill, on Stone Creek, about 3 miles from the summit, and from the top of the ridge eastwardly down the Branch of Big Sandy to the main Creek—crossing this at Perriman's Mill, and following the valley to the flat lands of the Oconee River about 30 miles. There is no difficulty in getting a favourable line along the valley of Big Sandy Creek on either side; our line however lay on the North side. On reaching the flat lands at the Oconee, we make a sweep to the left, and keep the river flats in a northerly direction about 7 miles to Bond's ferry, near where the line crosses the river at an elevation of 25 feet above the water, (at that time so low as to be barely boatable,) which is 236 feet above tide, and 88 feet lower than the Ocmulga at Macon. There is here a flat rock extending across, and forming the bed of the river, which offers an excellent foundation for a viaduct.

The line now bends again to the left, and follows the low lands of the river to Buffalo Creek, which is crossed near its entrance into the River Swamp, and followed on the northern side about 5 miles to Youngblood's Bridge—here the line recrosses, and pursues the southern bank of the stream about 3 miles, to the valley of Keg Creek, where the ascent is commenced to the summit of the ridge dividing the Oconee and Ogechee waters. This is effected by means of a stream called Limestone Creek, which has its source in a great number of heads near Sandersville.

Several attempts were made to find a route by different branches of the stream without success, but at length a line was found, which, though rather expensive and somewhat devious in its course, is practicable without exceeding an ascent of $21\frac{12}{100}$ feet per mile.

A great saving would of course be made by adopting in such parts of the line as we are now speaking of, a grade of 30 feet per mile, and the line could in all other respects be much improved by such a change. This subject will however be taken up in a subsequent part of this report.

Having reached the summit near the town of Sandersville, which is found to be about 500 feet above tide, we find an easy descent towards the Ogechee, by the branches of Williamson's Swamp to the main Creek, and following that to its junction with the Ogechee, we cross that river about 12 miles below the town of Louisville. Many lines were run with a view of finding a favourable crossing place higher up the river; but

the table of land occupying the space between the Ogechee and Williamson's Swamp, though tolerably level on its face, approaches the river so abruptly as to forbid a descent at 21 feet per mile,without a long and heavy cut and fill. It therefore became necessary to fall down to near the junction of the streams as above described. A very favourable country for a Railroad is then passed over,through the County of Burke; the line crossing Baker's Branch, Bark Camp Creek, Jones' Creek, and Buck Head Creek, with several small streams. Soon after entering the County of Scriven, Paramour Hill presents itself as an obstacle to our progress. This hill makes up to the Ogechee so abruptly, and is at the same time so deeply channelled by ravines and protruding points of high land, that a passsage for the road between the hill and the river is forbidden, without laying the line for a long distance in the River Swamp. To do this an embankment from 15 to 18 feet high, and a mile long would be required. This would be every year exposed to the freshets of the river, and would require a revetment of logs, there being no stone to be obtained for that purpose in this section of country.

The survey was therefore conducted around the summit of the hill, at a distance of about a mile and a half from the river, not however without encountering a very expensive series of cuttings and fillings to enable us to keep within our maximum grade.

After passing this point, the line was continued through the pine barrens of Scriven County, which present an undulating surface requiring occasionally heavy work to effect a favourable grade. The County of Effingham throughout its whole extent presents an extremely level surface; over these level lands the line was run into the County of Chatham, and terminated about the 1st of January, by connecting with a line about 15 miles from Savannah, which had been run by direction of the Chief Engineer, who had arrived from the North about six weeks previously.

The distance by the route I have just described is 210 miles, but it is susceptible of several improvements and alterations, by which I think it could be reduced to 200 or less. Some of these have been made, and others are now in progress and will be explained in their proper places.

On the arrival of the Chief Engineer in November, several exploring parties were organized and took the field with a view of finding a more direct route than the one above described; and in the mean time a line was run and located for the distance of about 9 miles from the City, in a direction which would be common to any route that might subsequently be adopted. A force of one thousand men was placed on this line, and the grading commenced on the Company's account; this method having been recommended by the Chief Engineer as being preferable to placing the work under contract.

The several parties in the field were employed in running various experimental lines, the most important of which were a Base line from the Ogechee River to Dublin in Laurens County. A Base line from the Ogechee River to Tatnall Court-House. A survey and levels of the New Dublin road. A line from Macon to Turkey Creek on the Oconee. A ridge survey from the head of Big Sandy Creek to Turkey Creek.—Surveys and levels between the Oconee and Ocmulgee, of the valleys of Ocwalkie, Turkey, Stichatchie, Beaver-dam, and Rocky Creeks.—Surveys between the Ohoopee and Ogechee Rivers, of the vallies of Pendleton's, Cedar, Bull, and Black Creeks, a traverse of the south-west side of the valley of the Canouchee; with many other surveys of less

magnitude, including traverse lines of most of the small streams in the vicinity of the Dublin and Tatnall bases between the Ogechee and the Canouchee Rivers. These surveys up to the end of April, including that of the North route, amounted in the aggregate, to a distance of upwards of 1000 miles; and were nearly all of them protracted—the plans on a scale of 2000 feet to 1 foot, and the profiles on a similar scale horizontal, and 200 feet to the foot vertical.

Approximate estimates of cost were made from the profiles, and on the 26th January, 1837, the Chief Engineer reported to the Board of Directors, that a route was practicable 30 miles shorter, and $500,000 less expensive than the northern route. On the following day the Board passed a resolution, adopting what has since been denominated the "Southern Route," and ordering the grading to be continued accordingly —the large force employed having by this time pushed the work as far as the line was common to both routes.

The surveys on which the estimates (forming the basis of the report above alluded to) were made, may be stated as follows.

1st. The entire experimental survey of the northern route described in the beginning of this report.

2d. The Base line from the Ogechee River to Dublin—thence to the mouth of Big Sandy Creek, (this last distance not having been surveyed was assumed to be 20 miles, and estimated equal to an average cut of 4 feet.) From the mouth of Big Sandy Creek to Macon, by the survey of that portion of the north route, thus forming a connecting line to Macon, with the exception of the interval between the mouth of Big Sandy Creek and Dublin.

The profiles were graded to a maximum slope of $21\frac{1}{100}$ per mile, and gave the following result:

1st. Northern route, distance 210 miles, Excavation and Embankment,	7 500 254 C. Yds.
2d. Southern route, as above described, Excavation and Embankment,	9 059 214 C. Yds.
Difference of Excavation and Embankment, in favour of the northern route,	1 549 960 C. Yds.
Difference in distance in favour of southern route,	36 miles.

It was now assumed, that if the southern route above described, a great part of which consisted of a straight line, presented so favourable a comparison with the northern, by making deviations from that straight line, a route could be found that would still be 30 miles shorter, and the cost be thereby reduced to half a million of dollars less than the northern line.

Surveys were continued to the end of April for the purpose of effecting that object, and which have been detailed above. It appeared subsequently, however, that no favourable line could be found without falling so far down the country, as to make the distance nearly or quite equal to the northern route.

The route which was eventually intended by the Chief Engineer, crosses the Ogechee River about 2 miles below Jencke's Bridge, and passes over Black Creek at Bird's Mill, thence in a straight line to Lott's Creek, which it crosses about 3 miles above its junction with the Canouchee River, and following up this river it crosses it near the mouth of Cedar Creek—takes up the valley of this creek to its head—passes over a summit into a small branch, and is then conducted to the

Ohoopee River—passing this river about 4 miles above the mouth of Pendleton Creek, it falls down into the fork of this creek and the Ohoopee, and continues up the valley of the former nearly to its head, then crossing over to the Oconee and passing this river a short distance above Turkey Creek, which is followed to the mouth of Rocky Creek—thence the route passes over to the head water of the Little Ocmulgee, and falls into the valley of Shell-stone Creek, by which it reaches the Ocmulgee in the vicinity of Taversville, and continues up the river to Macon.

As a considerable portion of this last described route has not been instrumentally examined, the precise distance connot be stated; but an inspection of the State Map will shew that it is nearly or quite as long as the northern line. It was the result of a reconnoisssance made by the Chief Engineer in the first part of the month of May, together with instrumental surveys before made, and which have been detailed above. Soon after returning from this tour of reconnoissance, he resigned the appointment Chief Engineer; and on the 10th of May, this department was placed under my direction.

The Board of Directors had become fully satisfied that the plan of carrying on the work on the Company's account was attended with great waste and sacrifice, involving a necessity of the employment of a host of superintendants, clerks, overseers, cooks, bakers, butchers, ostlers, &c., and were very desirous of placing it under contract. Accordingly, in the early part of March, the grading then remaining to be done from a point about 12½ miles from the depot at Savannah to the Ogechee River—a distance of 6 miles, was put under contract. Several short pieces between this point and the City remained however to be finished by the Company, all of which was soon completed, excepting the heavy embankment on the first of the road, which will be particularly mentioned hereafter.

On the 3d of June I received a communication from the President of the Company, in which he says: "Doubts have arisen, whether the true policy of this Company is not to open again the question of route, as we have not yet crossed the Ogechee, we may better now than hereafter change our route; and the questions on which you are now asked to advise the Board, are—

1st. At what point of the road now grading would the line of the northern route diverge if a change was determined on; and what amount in distance and value of work already done would be sacrificed?

2d. What are the advantages of the northern over the southern route; and what would be the increased distance of the former over the latter?

3d. What points on the northern route should be examined before a just and proper contrast of the two routes could be made? How long would it take to make such examinations?

4th. Could the proper data for a determination be obtained in time to put under contract 30 to 40 miles on either route before the 1st of November next?

5th Whether an alteration of the present maximum rate of grade from 21 $\frac{1}{10}$ to 30 feet per mile, would be attended with more advantages on the northern than on the southern route; and whether if such alteration were admitted, a location at once on the northern route might be ventured on, with the assurance that the difficulties on that route would be overcome by such alteration?

6th. Where the first obstacles on the northern route would be found?

I ask an early answer to these queries, and that your answer convey to the Board all the information on the subject in your possession."

In my reply to the above communication, I made the following statements:

"The point of divergence from the present graded road, should a change of route be determined on, would be within a short distance of the western side of the Little Ogechee.

The sacrifice of work already done would be $10,500 exclusive of engineering, and in distance about one mile and a half.

Among the many advantages of the northern over the southern route, are the following: An earlier developement of the benefit of the project both to the Company and the public. On the northern route, the work and expense of construction will be light for nearly the whole distance hence to Sandersville.

The Board is aware that the trade of the Counties of Washington, Jefferson, and Burke, was formerly enjoyed by Savannah, and until the introduction of Steam Boats on the Savannah River, which placed Augusta nearer on a level with this City, as a mart for the purchase and sale of produce and merchandize. Then, the trade of these Counties took that direction merely, on account of the shorter transportation.

The consequence has been, the decline of Savannah and the advancement of Augusta. Can we doubt that the establishment of a permanent, certain, and cheap line of transportation through these Counties, would reclaim to our City her lost trade?

The advantage of such a result, would not be merely the transportation of the Cotton crop. The intercourse of the inhabitants would be with this City instead of Augusta and Charleston. There supplies would be drawn from here, and the causes of the decline of Savannah being thus in a considerable degree removed, we might look with confidence to see her resume her former state of prosperity in a short period.

We approach within 10 or 12 miles of Louisville—within 2 miles of Sandersville—within 18 miles of Milledgeville—within 3 miles of Irwinton; and if the route via Commissioners and Walnut Creeks be found practicable, (of which I have very little doubt, provided grades of 30 feet per mile be admitted,) within 4 or 5 miles of Clinton in Jones County. Communications with all these places would doubtless be formed, and each of them being the nucleus of a more or less active, and some of them of a large trade: their passengers and light goods would yield a large revenue to the road.

A branch from this road to Sparta in Hancock County, (probably about 25 miles,) would take in a large circle of that rich and populous country, and could be made at a moderate cost.

The near approach of our road to Augusta (48 miles), would doubtless attract many passengers. Improved lines of stages would immediately connect with us, as the roads in that section are very good; and that great desideratum—a daily communication between this City and Augusta would be accomplished.

The greater facility with which slave labor can be obtained on the northern route than on the southern, I consider a great advantage. On the southern route, no negroes can be obtained until we reach the vicinity of Taversville in Twiggs County.

It is admitted that in the section of the country last named, a large amount of Cotton is made, and there are many wealthy inhabitants; but we should have the navigation of the Ocmulgee to contend with, which in ordinary stages of the river would take a large part of the crop.

By the adoption of the northern route, we should obviously be in a

better position to participate in the advantages of the various schemes of internal improvement now in agitation, than if we were to adhere to the southern.

The time will not permit me to collect the data for furnishing you with a statement of the amount of goods transported from the sea board to the different counties through which the road and its probable branches would pass; or their Cotton crops; I have no doubt however, that the Board is well informed on the subject.

There are many other advantages that will be overlooked in this hasty communication: and probably many that would strike the members of the Board, that might escape me.

The increased distance of the northern over the southern route, cannot with any certainty be ascertained, as no line as has yet been definitely fixed on for the whole extent of the southern route.

(To be continued.)

(Continued from page 112.)

Semi-Annual Report of the Water Commissioners, from the 1st *of July, to* 30*th December*, 1837, *inclusive.*

The plan of carrying the aqueduct across by means of iron pipes resting on a stone bridge has the following general character.

A semi-circular arch of 80 feet span, resting on abutment piers, which are raised 10 feet above flood tide, making the total height, from the level of flood tide to the under side of the arch, 50 feet, is placed next the southern shore of the river, to form a channel way for the same. At present the channel is about 150 feet from this shore, but the situation is favorable, and the tide current will very shortly cut a new channel, when it is restricted to a passage through this arch; and form as good a channel as the present, for any purposes, should it ever be wanted. From the north abutment of this arch to the north shore of the river, it is proposed to make an embankment of stone to support the foundation wall of the aqueduct. From the south abutment pier of the main arch, there is an arcade of three arches, one of thirty-five, one of thirty, and one of twenty-five feet span. From the south abutment pier of this arcade a foundation wall is carried up the ascent until it reaches the grade level on this side of the river. On the north side of the river, an excavation is made through the table land, and up the slope of the hill to the grade level, in which the foundation and side walls are to be laid, to receive the pipes. The foundation wall above described as extending each way from the abutment of the arches, is designed to be formed of dry masonry, except two feet on each side, constituting the face, and two feet across the top, to form the bed for the iron pipes, which are to be laid in cement. A parapet or retaining wall is to be raised on each side to support the earth covering, which is to be four feet deep above the pipes.

Commencing on the north side at the influent pipe chamber, the preparation for the pipes descends nearly parallel to the slope of the hill, making a small angle near its base, and thence to the level adopted as the lowest, which fixes the top of foundation wall for pipes, at four feet above flood tide. This level is continued to the angle it is necessary to make to rise over the high arch, from whence an inclined plane is carried to the effluent pipe chamber on the south side of the valley.

A foundation wall is designed to form the beds of the pipes. This might, in a great degree, be dispensed with, as in ordinary cases; but in order to guard against any injury that one pipe might receive from a rupture in another, it is deemed prudent to give a solid foundation, that would resist a current of water, should an accident occur.

An influent and an effluent pipe chamber will be required; one at the termination of the aqueduct, on the north side of the valley, and the other on the south side. Into these chambers the pipes will respectively be inserted, in well wrought masonry. It is proposed to arrange the pipes in such a manner as to admit of a gate for each pipe, so placed that one may operate independently of the others; in order that any one pipe may have the water shut off, and undergo any repairs that may be required, without disturbing the regular operation of the others. The walls of the pipe chambers are to be carried up and receive a roof, to protect the chamber and gates from improper approach; and serve, at the same time, a useful purpose as a receptacle of tools, and such materials for repairs, as it may be prudent to have in store The gates are to be of cast iron, working in well fitted frames of the same material.

At some convenient place, in the lowest level of the pipes, a stop cock, to operate as a waste cock, will be required. The object of this is, to clear out any sediment that may accumulate in the bottom. It is probable very little will ever be deposited, that cannot be forced through by a current that might be made in the pipe; but the waste cocks are deemed the most certain, effectual and convenient means of accomplishing this object. It is proposed to enclose the waste cocks in the same manner as the pipe chambers.

The width of the bridge must depend on the width required for the pipes: and this again, will depend on the diameter of the pipes. A single pipe, sufficiently large to carry the whole quantity of water, would be accommodated on the most narrow bridge. There are, however, objections to this: a single pipe would place the successful action of the aqueduct on its good condition; consequently, interruption would be involved in any necessary repairs; which it is important to avoid, by every reasonable means in our power; and very large pipes would be more liable to imperfections than smaller ones. Water pipes of cast iron have not, that I am aware of, been larger than three feet diameter. The principal iron mains, in the water works of London, are of this size; and the same are used in a part of the water works in the City of Glasgow, in Scotland. I can see no reason why this particular limit has been adopted, unless experience has decided it to be most economical. There certainly can be nothing impracticable in going to four feet, so far as the making the casting is concerned, for experience in casting cylinders for steam engines has demonstrated this; and were there any particular necessity for this dimension, I should have no fear that it might be successfully accomplished. But in view of all the circumstances of the case under consideration, I have arrived at the conclusion, that three feet pipe will be most appropriate.

In order to economize the expense of crossing this valley by iron pipes, I have allowed two feet fall, in addition to the declivity that would be given by the regular inclination of the aqueduct. Without stopping here to explain the influence of this measure, I will merely observe, that we shall still have, at the distributing reservoir, as great an elevation as it will probably be thought expedient to maintain at that and the intermediate ground. With this declivity, four pipes each three feet diameter,

will be sufficient to discharge the same quantity as the aqueduct of masonry, on the established inclination. The comparison is as follows:

One pipe will discharge 2,000,163 cubic feet, or 12,460,996 imperial gallons, in twenty-four hours—and

		Imperial Gallons.
Four pipes	8,000,652 cubic feet .	= 49,843,984
Aqueduct of masonry	7,953,120 " " .	= 49,547,937
Excess of pipes	47,532 " " . =	296,047

I have made a computation for pipes 30 inches in diameter, and find the ratio of discharge of 30 to 36 inch pipe is as 1 to 1·55; and the ratio of cost is as 1 to 1·26. It therefore appears, that, (more than 6,) say 6 pipes, of 30 inches, would be required to discharge the same quantity as 4 pipes of 36 inches. The comparative account of expense for pipes to discharge the same quantity, allowing the 36 inch only a 50 per cent. greater discharge, will be as follows:

6 pipes, 30 inches diameter, at 1	= 6·00
4 " 36 " " at say 1·25 . . .	= 5 00
Difference	1·00, or

the 30 inch pipe will cost 20 per cent. more than the 36 inch, to discharge the same quantity of water.

The bridge to support the pipes will require to be at least 6½, if not 7 feet wider for 30 inch than for 36 inch pipe, which will increase the cost $30,000. This, added to the difference in the pipes, will make the total excess of cost for 30 inch pipe over that for 36 inch, $54,000.

If it be inquired, why not institute a comparison for pipes of larger diameter? the answer will be found, in part, from my observations in the preceding pages; on experience at the London and Glasgow Water Works, where 3 feet seems to be the maximum size in use; and the propriety of having two pipes, as a measure of prudence, that one may supply, in the event of any repairs being required on the other. But we have four 3 feet pipes. This is true in relation to the ultimate perfection of the plan; but only two are designed to be put down in the first instance, as they will probably be sufficient for the next fifty years; and the additional ones may be laid down whenever the wants of the city shall demand them.

ESTIMATE FOR AN INFLUENT PIPE CHAMBER.

110 cubic yards concrete and rubble masonry in foundation, at $6		$660 00
70 cubic yards cut stone masonry in flagging, jambs, lintels to gates, and pipe apertures, at $33		2,310 00
180 cubic yards side, spandrel, and retaining walls, at $12		2,160 00
15 " " arch stone, at $20		300 00
95 " " masonry in house walls, at $7 . . .		665 00
Roofing, doors, and windows of house, estimated . .		300 00
		$6,395 00
4,200 lbs. iron castings, for gate frames and gates fitted up complete at 8 cents	$336 00	
Carried over,	$336 00	$ 6,39500

Brought over,	336 00		$6,395 00
200lbs. wrought iron, in screw rods, screw bolts, and wrench, complete, at 25 cents . .	50 00		
100lbs. wrought iron clamps, for securing coping and jambs, at 12 cents	12 00		
1,200lbs. lead, for fastening clamps and making joint between mouth of pipe and masonry, at 9 cents	108 00		
14,400lbs. iron castings, in wall pipes, at 5 cents	720 00		
Workmanship in putting down pipes and hanging gates	200 00		
			$1,426 00
			$7,821 00

The plan of influent and effluent pipe chamber will be similar; consequently, the estimate will be the same for each.

By a letter from F. Graff, Esq., of Philadelphia, I have been furnished with a statement of the cost of iron pipes, at different times, in that city; from which it appears, the ordinary size pipe has cost from $50 to $65 per ton. And Mr. Graff gives it as his opinion, that pipes three feet in diameter, may be furnished at from $70 to $75 per ton. But, in order to be safe, I have put this item at 4 cents per pound, in the estimate.

It is proposed to make the metal of the pipes one inch in thickness; except at the hubb, which is to be 1·75 inches. As less than one-third of an inch is competent to bear, permanently, the pressure of water on the pipes, an inch may be considered abundantly safe; and this thickness will ensure a perfect casting.

The pipes are usually cast 9 feet long. The lap, for pipes of this size, may be 7 inches; leaving the length each piece of pipe will make, when laid down, 8·42 feet. A piece of pipe will contain 13,479·21 cubic inches × ·27 = 3,639lbs., equal 432lbs. per foot run of pipe laid.

ESTIMATE OF EXPENSE FOR ONE FOOT OF PIPE LAID DOWN.

432 lbs. castings, at 4 cents			$17 28
200lbs. lead for one joint, at 9 cents . . .	$18 00		
Yarn, tallow, &c., estimated at	1 00		
Labor laying down and making joint . . .	5 00		
Transportation	3 00		
	$27 00	=	3 20
			$20 48

GENERAL ESTIMATE FOR PLAN BY PIPES.

1,800 cubic yards rock excavation, at $1 50 .	$2,700 00	
10,500 cubic yards earth excavation, at 14 cents	1,482 00	
		$ 4,182 00
25,000 cubic yards stone embankment at $2 00 . .		50,000 00
800 " " slope wall, at $2 50		2,000 00
950 " " main foundation wall, laid in cement, rough hammered, at $7 00		6,650 00
Carried over,		$62,832 00

	Brought over,		$62,832 00
6,500	cubic yards main foundation wall, laid dry, in interior, at $2 50		16,250 00
720	cubic yards side walls, north side of river, at $6 00		4,320 00
1,400	cubic yards side and parapet walls, from north side of river to angle, at $7 00		9,800 00
980	700 cubic yards parapet wall, from angle in river to pilaster of main arch, at $8 00		5,600 00
	280 cubic yards parapet wall, between south pilaster and south shore, at $8 00		2,240 00
3,000	2,200 cubic yards wall for foundation of pipe, exclusive of that over the arches, at $6 00		13,200 00
	800 cubic yards wall for foundation of pipe, over arch and between pilasters, at $6 00		4,800 00
			$119,042 00
Main arch, 521 cubic yards, at $30 00		$15,630 00	
Three small arches, 391 cubic yards, at $25		9,775 00	
Abutment and pier of main arch	=1,250		
Abutments for small arches	=1,088		
	3,338		
cubic yards, at $12		40,056 00	
Exterior spandrels to main arch, = 800 cubic yards, at $10		8,000 00	
Spandrel walls, solid for small arches, 832 cubic yards, at $6		4,992 00	
Hance wall for main arch, 500 cubic yards, at $7		2,500 00	
Pilasters, 230 cubic yards at $12		2,760 00	
Parapets, exclusive of coping and water table, 680 cubic yards, at $12		8,160 00	
Water table and coping, 250 cubic yards, at $30		7,500 00	
Coffer dam, including excavation and pumping; based on a detailed estimate for *high* bridge, being larger and more expensive by about fifty per cent.		22,000 00	
Centering for arches		3,500 00	
Earth covering, 5,500 cubic yards, at 30 cents		1,650 00	
Earth covering, 9,000 cubic yards, at 15 cents		1,350 00	
			128,823 00
	Total for bridge		247,915 00
Two pipe chambers, as per detailed estimate, at $7,821			15,642 00
Waste cocks, and house over them, estimated,			2,500 00
1,480 feet of pipe, as per detailed estimate, at $20 48 = 30,310 40×4 pipes			121,241 00
			387,298 00
As this work is, in some parts, liable to greater contingent expenses than usual; and also extra superintendence, I have considered it proper to add ten per cent. on the whole: which is independent of the ten per cent. to be allowed in the general estimate, for contingencies and superintendence			38,729 00
Making the total cost by pipes			$426 927 00

The estimates for the two methods are now ready for comparison.

High bridge, maintaining the established inclination over the valley	$935,745 00
Pipes supported on a low bridge	426,027 00
Excess of high bridge = . . .	$509,718 00

No allowance has been made for the loss of two feet elevation by the pipes. It is not believed, however, that this would make any material difference, excepting for about four miles north of Harlaem River, where it might be expedient to lower the grade a few feet; which would not produce any important difference. But in order that the estimate should not be presented in a manner to do injustice to the high bridge, nothing has been added for contingencies; which, I believe, from a careful review of the estimates, is quite as much rrquired for this as for the plan by pipes.

It appears the plan by pipes has largely the superiority in point of economy. In my opinion, it will be fully as efficient. The pipes will decay, by the action of time, more rapidly than stone masonry; especially, if the masonry can be kept from injury by frost. But as only two, or half the pipes, are required to be put down at present, it may be assumed, that if the $66,000, saved by this, is invested at five per cent. it will produce a sum that will forever maintain the pipes, to the full extent that may be wanted. The high bridge will be more exposed to casualties that may, at some future period, seriously interfere with the successful operation of the aqueduct. It is, however, greatly superior, in point of architectural magnificence, and maintains two feet greater elevation. These are the only points of superiority I have been able to discover, and can therefore have no hesitation in recommending the plan by pipes as decidedly the most appropriate. Respectfully submitted.

JOHN B. JARVIS, *Chief Engineer, N. Y. W. W.*

Mew-York and Albany Railroad.

WE published in No. 3 the proceedings of a spirited meeting of the inhabitants of Westchester and Dutchess counties, in relation to the New-York and Albany Railroad; and we now publish a communication from the Commissioner, Joseph E. Bloomfield, Esq. to the President and Directors of the Company, giving an estimate of the amount of business which will naturally pass over this road—with the single remark that *any* estimate made upon present data, will be more than realized when the road shall have been completed in 1842:—

To the President and Directors of the New-York and Albany Railroad Company.

GENTLEMEN:—An able pamphlet, with "Facts and Suggestions" relating to the New-York and Albany Railroad, laid before the public on a former occasion, leaves but little to add to show the importance of this main stem to all our Northern lines of Railroads.

The Railroads now in the course of construction, from Boston to Albany, thence to Lake Champlain, Ontario, Erie, and to the "Far West," the

trade and travel on which will seek the New-York and Albany Railroad, exceed 2000 miles in length. Travellers on these roads, to approach the city of New-York at all seasons of the year, must use the New-York and Albany Railroad.

The New-York and Erie Railroad Company, to enter the city of New-York, in conformity to their charter, will naturally seek a junction with the New-York and Albany Railroad. The Southern tier of counties, will call for this, as a *sine qua non* to advance the interests of their commercial emporium and their own prosperity.

It has been found that this Southern trade can be brought to the North river, via Newburg, Kingston or Catskill, upon a more favourable, as well as shorter route, (grades considered) than by cutting through the Shawangunck mountains.

This fact is verified by the surveys made by the engineers employed by the Ulster, Catskill and Canajoharie Railroad Companies and others.

Should the State assume the construction of the Erie Railroad, (which she has reserved the right to do in the charter) the money for its construction will be disbursed in those counties where it can do the most good and subserve the interest of the greatest number.

The importance of the New-York and Albany Railroad, to the "secluded districts" of the Eastern river counties, is brought to view by the Geological report of Mr. W. W. Mather to the last Legislature (Assembly Doc. No. 200). The information in this document is various and valuable to the public, and may be relied on. The entire report on the first district extends over forty pages replete with interesting matter.

The annexed extracts, in a condensed form taken from a Poughkeepsie paper, show "inexhaustible beds of iron ore," with quarries of marble, granite, and lime-stone, "without limit to any finite period of time." The value of these materials for building, and their cheap transportation into the heart of the city of New-York by the railroad, must be apparent to every person.

In addition to the mineral and building materials, the rich agricultural products of Westchester, Putnam, Dutchess and Columbia counties, claim attention, furnishing important items of revenue to this road.

The New-York and Albany Railroad will afford an avenue for the transportation of the various articles daily required for the consumption of families, and this too at half the rates of transportation now paid to transfer them to the Hudson river from the counties of Westchester, Putnam and Dutchess, to be monopolized at our wharves by those who forestal our markets in the necessaries of life. The yearly saving to the city in transportation and prices, would build the New-York and Albany Railroad. To illustrate this view, it is fair to presume the construction of this railroad will reduce the price of provisions and the expense of housekeeping full 25 per cent.

There are in Brooklyn and New-York (six persons to each family,) fifty thousand families, besides persons employed in packets, steamboats, &c., who spend on an average at least $250 per annum. This multiplied by 50,000 will give the sum of $12,500,050, one-quarter of which $3,125,000, it is safe to calculate, would be yearly saved, by the construction of the New-York and Albany Railroad, in provisions, buildings, &c.

With the certain and rapid increase of the city of New-York, what will not our prices rise to for the necessaries of life, unless we open an avenue to the interior? It is said, and no doubt correctly, that the city of New-York now derives one-half of her supplies of fruit and delicate

vegetables from New Jersey, principally along the line of the Amboy and Camden Railroad, and but for this railroad our markets could not be adequately supplied.

An estimate of the income which the New-York and Albany Railroad will yield to the stockholders cannot be given with accuracy. We subjoin what is believed to be substantially correct, it is derived from the best sources of information.

The first view that will be taken of "the probable business of the New-York and Albany Railroad for one year," is a statement made July 1836, by a Committee of the town of Pawlings in Dutchess county, of which Jonathan Aikins was chairman. They say, "with a view to more accuracy, we begin with our own town of Pawlings."

IMPORT OF PAWLINGS.

150 Tons of Plaster at $5, per ton,		$750
60 "	of Merchandize, except salt,	300
60 "	of Salt about 5½ bushels to each family, but when pork is barrelled in the country, it is a much larger quantity,	300
30 "	Lumber, staves, ploughs, mill gear, &c.,	150

EXPORTS.

90 Tons of fresh pork, when barrelled, much more,		450
120 "	Grain, flax seed and other products,	600
40 "	Dairy, products, small stock, poultry, &c.,	200
		$2,750
1200 Passengers, at the present prices by the Steamboats, being 600 each way,		2,400
		$5,150

NOTE—It is too expensive to transport Hay to the Hudson river.

We next take two towns in Putnam, viz: Patterson and South East, each equal to Pawlings,	10,300
We then proceed to six towns in Westchester, through which the New-York and Albany Railroad will pass—say,	16,000
The town of East Chester, with Mr. Kane's marble quarry,	15,000
We now proceed to the town of Dover. We are informed by Mr. E. Stevens the owner of one stone saw-mill, that the past year, 1835, he sold $10,000 worth of marble, all tomb-stones, that he contracts with his teamster who transports his marble to the Hudson river, after discharging a load of marble (at Pokeepsie) to return a load of sand for cutting other stone; Mr. Stevens, sells for 50 cents per foot, and 50 superficial feet make a ton (say 2 inches thick.) There are 13 mills in the vicinity, one mill therefore gives 333 tons, but to be safe say 250 x by 13, the No. of mills gives 3250 tons, of which deduct half sold at home, this leaves 1625 at $5, per ton, to the Hudson, equals	8,100
Call sand only 13,000 tons,	6,500
1400 tons for furnace,	7,000
550 " other articles same as Pawlings,	2,750
Add for passengers,	2,500
	$26,850

The town of Amenia now produces (1836) from two furnaces, 1400 tons iron,	$7000	
1000 tons other articles,	5,000	
Add for passengers,	3,500	
		15,500
The towns of Sharon and Salisbury, in Connecticut, we estimate at		48,000

Careful estimates have been made by the inhabitants of Berkshire county, Massachussets, in reference to the amount of tonnage transported by that county. They put it at about 40,000 tons, annually transported to the Hudson river, the principal part of which goes to New-York. If we put the cost of transportation at the rate of $5 per ton, it will amount to $200,000. That we may certainly be within the truth, we will take, instead of 200,000, only 150,000 for Berkshire county.

It will be observed, that our estimates are at $5 per ton, which only carries to the Hudson river.—We believe the additional cost of freight on the river is frequently charged at 25 cts per cwt.; but we will say $1 per ton, which, for half the amount transported from Berkshire alone, is $20,000.

We will now recapitulate our estimate, beginning with the town of East Chester,	$15,000
Six other towns in West Chester,	16,000
Two towns in Putnam county,	10,300
Pawlings,	5,150
Dover,	26,800
Amenia,	15,500
Sharon and Salisbury,	48,000
Reduced estimate of Berkshire, exclusive of passengers,	150,000
Add freight of same on river,	20,000
	$306,750

This sum is now paid (1836) by the towns along the line through which the road will pass, including Berkshire; and is sufficient to pay 24 per cent. gross on the estimated cost of the road [by J. D. Allen Esq. civil engineer,] from Harlaem river to West Stockbridge. It should be taken into consideration that the towns not enumerated and adjacent to the railroad, may be safely calculated at one-third the estimate which precedes, $103,250, say, for round numbers, $400,000.

In addition to this view and estimate taken by a respectable committee of the town of Pawlings, in the completion of the road only to Sharon, on the Connecticut line, it is now ascertained by the surveys of Mr. R. P. Morgan, completed to Albany, that the line can be extended through Columbia and Rensselaer counties with no grade to exceed 30 feet in the mile with a distance of 150 miles from the City Hall, New York, to Albany.

The Albany and West Stockbridge Railroad Company must intersect their road with the New-York and Albany Railroad, near the same point on the Hudson and Berkshire Road to reach Stockbridge. This will naturally merge their road into the New-York and Albany Railroad, and will make it the main trunk and thoroughfare to Boston, to the Canadas, and to the West.

The number of passengers by these routes, who will take the Railroad to New York, cannot be stated with any certainty, but from the West we

have the fixed data of the Mowhawk and Schenectady Railroad Company, which by the printed reports of the Company, have exceeded 150,000 per annum, for the last three years.

It is safe to estimate, that one-third of this number, say 50,000, would take the New York and Albany Railroad, for the following reasons, to wit:—

1st. To vary the route.

2d. To save from four to six hours in time, and to keep up with the mail which would be carried on this route.

3d. From necessity in the winter, four months of the year.

The average fare for passengers, winter and summer, should not exceed $3—but say $2 1-2—is $125,000.

A large portion of the passengers from Boston, Massachusetts, Vermont and New Hampshire, who seek Troy, Albany, and other points on the North river and Sound, will naturally take the New York and Albany Railroad, so soon as the "Great Western Railroad" of Massachusetts is completed.

This important link in our internal improvements, will be completed within 2 1-2 years, and form a continuous line (of about 270 miles) from New York to Boston, at all seasons of the year. It is safe to estimate the sum of $75,000. as an additional item in the profits of this road to be derived from passengers in this direction, when it is understood that the numerous steamboats that ply daily on the North River, average from the different landings 750 passengers each way for six to seven months in the year.

The celerity with which the mail can be carried to Albany, (6 to 8 hours) also to intersect the branch to Boston in 12 hours, should command from the general government at least $50,000.

Freight.—It is difficult to estimate the amount of merchandize that now finds its way to Philadelphia, and from thence to Ohio and the far west. This trade, on the construction of the New York and Albany Railroad, would seek this route to Albany and Troy, and thence by continuous lines of railroad, in the course of construction, to lakes Ontario and Erie. These lines will be completed within three years—on this point there is not now a doubt. The blockade, by ice, which the city of New-York suffers, on the closing of the canals, for four and a half months, will be removed; the price of flour and other provisions, will be regulated; beef and pork, which are often injured by being killed too early to reach the city on the close of navigation, will form a large item of the profits of this railroad, from their bulk and weight. A month in the spring and fall, of the best milling seasons in Rochester, Oswego, and other points, is lost for all regular and certain supplies of flour.

Half of the amount of grain raised and ground in the State of New-York, is sold and distributed to the New England States.

Those parts of Massachusetts, Connecticut, Columbia, Dutchess, Putnam and Westchester, on the line, will receive their supplies by the New-York and Albany Railroad.

Ship timber of large size, to wit: oak, chesnut, and locust, of the best quality, abounds in the route. It is now valueless, except for fuel at $2 per cord. The frames of vessels can be got on the line of the road, transported to, and put on the Harlaem river, to which point the ship building of the city is destined to pass. Its capacious indentations and security from all winds and currents, indicates the termination of the New-York and Albany Railroad as a position at which to concentrate this business.

Charcoal is now furnished to the many furnaces on the line at an average of 7 cents per bushel. It is ascertained that in clearing off the forest, it will reproduce an equal quantity of coaling timber in twenty years. Should this source of supply fail, from the increased demand in working the iron ore beds, the return cars of the railroad can take anthracite and bituminous coal to supply the deficiency, or, as is most probable, the ore would seek the coal on the banks of the Harlaem river. —The abundance of fuel on the whole line of the road is a very important consideration in the expense of Motive power for transportation.

The counties of Dutchess and Putnam now furnish the New-York market, besides calves, sheep and lambs in great numbers, about 300 head of fatted cattle per week. These cattle are purchased at the west in the autumn, and fatted on their rich pastures the following spring. It has been ascertained that these cattle lose 8 per cent. by driving or by steamboat, independent of about $3 per head expenses to reach the New-York market. This per centage on their average value of $60 each, is a loss to the farmer and consumer of $79,200 per annum. The half of this sum, say $40, 00, would be a liberal recompense to the Railroad for the transportation of these cattle, as daily wanted at the Bull's Head.

Calves and Lambs take about 24 hours to collect at the first depot,
24 hours to send to New York,
24 hours before they are killed,

[making 72 hours they are kept with very little food and water, and are killed in a state of fever.

The calves now cost about 75 cents transportation to the city—weight about 125 lbs. 18 pence for calves, and 6 pence for lambs, will pay the Railroad.

Hay in any quantity can be furnished in Dutchess at $7 to $8 per ton, and pressed can be transported to the city $2½ per ton.

Butter costs the producer 1 cent per pound, to carry to the city, and a like sum is paid to huckstering agents for commissions on sales, equal to $40 per ton.

Say that the value of land is increased only $10 per acre for five miles on each side of the road for 100 miles of the 150—this equals 640,000 acres, or $6,400 000.

This is but an approximation to the value that will be given to the timber, the grass and grain lands.

The marble quarries and inexhaustible iron ore beds, with the trade and transportation of lime, will be immense.

A review of the items of income here thrown together, show the following results:—

Passengers	$225,000
The transportation now paid on the line of the road, to the Hudson river, is $400,000—say the half of this to deliver them in the centre of the city	200,000
Transportation of the great Northern and Eastern mails, for Albany and Boston	50,000
Transportation of Beef, Calves, and Lambs	400,000
The increased trade, in transportation of Marble, Granite, Lime, and Iron	50,000
	$925,000

Brought forward .	$925,000
Ditto, in agricultural products from the West, and on the line of the road	200,000
Ditto from the Dairy, ...	25,000
The merchandise, now shipped in the spring by the Pennsylvania Canals and Railroads, it is difficult to estimate. New York, to sustain herself in her natural position, must have a continuous line of Railroads to the upper lakes,—on the completion of the New-York and Albany Railroad,—it is not extravagant to estimate this item, with the increased returns in flour, pork, tobacco, &c. from Ohio and the West, at .	200,000
Estimated income for one year	$1,350,000

The foregoing statements and estimates have been made by the Commissioner of the Road, at the request and with the sanction of the Executive Committee of the Company.

Long Island Railroad.

For the Railroad Journal and Mechanics' Magazine.

Boston, August 10, 1838.

The western part of Long Island resting immediately on the city of New-York, and connected with it by a ferry of only half a mile in width, is sufficiently known to the inhabitants of that city, as rich in agricultural advantages, not to mention the inducements which it offers to tempt the sober and regular citizen occasionally from his every day beat—but the Eastern section of the Island is all but *terra incognita* to him; a great portion of it is in fact as much a wilderness, and as far as man is concerned, as much a waste, as any portion of the Western country; it is, therefore, the privileged haunt of a few sportsmen of the Wilson school, who, in proportion to its exemption from all modern and easy modes of intercourse, such as steamboats, railroads, and the like, (which to the chagrin of the collector and amateur, have lately thrown the most impenetrable fastnesses open to the common admiration of plebeian and patrician) value and eagerly appropriate its peculiar forests pleasures, and hunt the deer, and the wild fowl, uncontrolled and undisturbed by any traces of cultivation.

It is not meant to be said by this, that the Eastern portion of the Island is unappropriated, nor that it is entirely uncultivated; for on either shore, and especially on the northern, there are continuous patches of cultivation, or clearances, with an industrious, though meagre population. But by far the larger portion of the entire Eastern end of the island is at this moment in a state of nature: the coarse oak scrub, which grows short, but thick and shaggy there,, and the patches of pine, which amongst this forest of oak bushes, dot the entire southern plain, appropriate millions of acres; the deer is common enough there; the pheasant, until lately, was known on this island; all descriptions of wild duck, and wild goose, in their seasons, visit these shores comparatively undisturbed; the partridge, and quail, and woodcock, and plover, are found in plenty; and, in short, all other denizens of the free forest peculiar to this latitude.

We are now to look at the causes which have left a section of country, bordering so near the City of New-York, so long uncultivated, and we are to consider whether these causes are attributable to the barrenness of the natural soil, or to the want of the means of communication with the City. Want of enterprise in the inhabitants will form no part of this

estimate, for it is sufficiently obvious that within 100 miles of the City of New-York such a want must be unknown,did sufficient and comparatively safe opportunities exist to draw it into action.

The northern side of Long Island, or the side which borders on the Sound, consists of an irregular range of miniature hills, for they never exceed 400 feet, and average probably only 200 feet in height, in which, as far as we have known them examined, no rock is found in site; they appear to consist entirely of gravel, clay, and boulders; gravel is a principal ingredient; the boulders consist of varieties of granite and gneiss, whose local or natural sites it would be curious to trace on the main land, whence they must undoubtedly have been either violently or gradually removed; in many places they are found embedded in a stiff blue clay; a good clay for making bricks is occasionally found, particularly about the centre of the island. This range of broken ground, generally speaking, may be said to constitute one-half, and the longitudinal northern half of the Island; the other, or southern half, speaking in equally general terms, consists of a vast plain, very level in its appearance, and not unlike a prairie, as viewed from some of the peaks of the northern ground; the width of this plain from the sea to the base of the hilly ground, varies from three to six miles, rising gently from the southern shore at the rate of, it may be, twenty feet per mile. It is this plain which remains chiefly uncultivated or unappropriated to any useful purpose; the other country to the north is in great part cleared and farmed, and the natural soil is sometimes rich, and always superior to that of the southern side, though this is not the main cause of its advanced state; neither shore can be called bold, for the Island in all its details is exempt from this title, but the northern side may be termed bold comparatively; it presents generally to the waters of the Sound, a steep gravel front of from 30 to 50 feet in height; on this shore there are several small harbours, none that I know of of great importance, Greenport and Sag-Harbor excepted; but they are at least available for farming purposes, and when coupled with the sheltered waters of the Sound, present facilities in this respect greatly superior to the southern shore. These harbours admit small craft carrying lumber and manure, and some of them offer shelter during stormy weather to the coasters which ply in the Sound; in general they are said to be of intricate entrance and possess but a minimum depth of water for such purposes: one or two small steamboats generally ply along the shore, during the summer, touching at all the different openings. There are but one or two villages, however, of any importance, nor is it easy to conceive under the present state of affairs that there ever should be more, since there is no back country of any extent to support them, and for the same reasons there is not a sufficient quantum of interest existing at any point on the island to induce, with any probability of success, the opening of competent thoroughfares behind; the length of the Island dissipates its strength, and thus its internal improvements, though they may be suggested from within, cannot be altogether perfected there, but must depend to a degree on extraneous assistance.

The southern shore on which lave the waters of the Atlantic, is peculiarly formed, so peculiarly that I can hardly expect to describe it intelligibly—this shore forms the extremity of the wide plain which I have already spoken of, and therefore this shore viewed from the sea appears quite low and flat; the waves of the Atlantic do not roll immediately upon the main-land of the island, but are separated from it by what the

Long Islanders term the "beach," which is a narrow bar of gravel, separate from the main shore, and elevated a few feet above the highest tides; within this bar and between it and the main land, (not a very appropriate term when speaking of an island. but we know of no better), lies, what on Long Island is termed, the bay; a shallow stripe of salt water from one to four miles in width, and which communicates with the ocean through various openings in the bar already mentioned; these openings constitute likewise the entrances to any harbours which exist on this side, and as may readily be conceived, do not afford very safe passage—the waves lash with great violence on this outer bar, and with great violence through these openings during gales, in proportion to their shallowness, and none of them are deep. I have been told that there exists another bar, just without the breakers, which, however, is always covered with water. Occasionally points of the main shore connect with the bar, and thus separate the inner waters into a series of small bays; on various points of these bays, landing places are formed for small sloops, and such are used for the same purpose as those on the Northern side, although not so extensively. The harbour is not so good, the entrances are not so safe; the navigation outside is completely open and unsheltered; and the risk and delay are immeasurably greater in consequence, than on the Sound. There are therefore, no steamboats on this side: these causes will always render this side of the island, in every respect, less valuable for agricultural purposes than the Northern, until some artificial inland opening be made through the centre of the island, to which, while it shall be superior, in every respect, to the navigation, even on the Sound side, will enable both sides, and especially the Southern, to carry its supplies to market, at a rate admitting of competition with the more favoured lands bordering the Hudson, and which shall draw to it a population sufficiently dense, and, therefore, sufficiently enterprising to furnish the means of making all the local and peculiar improvements, which in every section of the country are more or less necessary to its prosperity. To whom shall a Long Islander look at present for support to schemes of the most apparent and prudent advantage? Not certainly to the neighbouring proprietary; if he travel six miles back, he will find the social interests already changed; the men will have become Southern or Northern shore men, according as he is Northern or Southern himself. Their interests will embrace the shore which lies nearest to their properties; if he move laterally, he will find a new interest at every new landing place. This state of affairs can only be mended by the fortuitous interference of foreign interests—foreign as respects the island,—and such a beneficial interference to the Long Islander would be the Long Island Railroad. This road, which would form one branch of the great natural thoroughfare between Boston and New-York, would, independently of the various and tumultuous interests on the island. and independent of its support or its capital, open just such an inland communication as the island peculiarly requires. It would place its products, in point of distance and in point of cost, on an equality with the lands along the Hudson from the city; and inasmuch as it did this, it would offer an immediate and adequate encouragement to all the farmers on the island, to extend and improve their system of cultivation—to bring into play the unoccupied lands—to raise crops with a view to another market, not to their own support merely, or that of their neighborhood. Inasmuch, besides, as land any where along, the Hudson within equally available limits, is valued much higher than the same land

on Long Island, from peculiar advantages which, hitherto, Long Island has been known not to possess, it will draw to the island the same description of productive capital, which elsewhere finds at present such advantageous employment, in furnishing the city with vegetables, with grains, with fruits, with poultry, and other productions of the same description. It would likewise draw towards it a certain description of the population of New-York, which must ever be increasing and which can no where find so convenient or economical a vent; I mean the class of householders, who, originally from the country, or estimating justly the benefits of a country residence of a young family, desire to reside there, if not during the year, at least for a considerable portion of it, and who would have executed their desire, did any opportunity present itself sufficiently convenient, not to interfere with their particular pursuits. This class cannot escape across the Hudson; the distance is too great, and the nearest lands in consequence of the low grounds are not very healthy; neither can they escape on York island itself—the very rich have already pre-occupied that very convenient piece of ground. On Long Island, however, if the railroad were formed, they would find conveniences sufficient to induce them to connect themselves with its interests; the distance from New-York to Brooklyn is from ½ to ¾ of a mile—the ferry is rarely interrupted, even in winter; the railroad, as all railroads are, is peculiarly constant in its arrangements, and has already promoted its interests, by accommodating a similar class at Jamaica, and would doubtless always be interested in accommodating such, aside from its transportation of the Boston travel; the island is peculiarly dry and healthy, and appropriate, especially along its centre line, to such purposes—however defective in respect of bold or grand scenery, it possesses many beautiful spots among its small hills, presenting confined but very pleasing and snugly sheltered situations for summer residences, and on the Northern side there are many views and openings towards the waters of the Sound, which are exceedingly picturesque. The picturesque, however, is not always the most convenient ground for a country house, and I am at present looking out for retreats for men of business, not wonders for men of taste.

The two best harbours on the island, Greenport and Sag Harbour, lie at its Eastern extremity. These harbours afford safe shelter for the largest class of vessels, in proof of which it is sufficient to say that the whale fishery forms their chief surport. Whichever of these harbours should be chosen as the terminus of the railroad, and Greenport would probably be the most convenient; it is not to be forgotten that during severe winters when the bay of New-York is altogether closed to its own ships, this harbour might be used with advantage as a temporary discharging point for the city, and whence cargoes might as well be despatched abroad.

Our observations tend to prove that it is the want of ordinary facilities of communication with the city which has prevented this island from advancing so rapidly as by its position it ought to have done. Long Island is indeed, at present, far behind the world about it; it cannot compete with the Hudson while it has not the same facilities of communication, and it cannot create these facilities within itself where its native interests are from its peculiar form so broken and diversified. A railroad would therefore be to it an immeasurable blessing, opening to it all the sources of profit which have so enriched the other lands around New-York; and these advantages would enable it in its turn to be of more benefit to the

railroad, than at present any one would be willing to believe. We know that its lands, wherever opened and cultivated, have produced faithfully, and can compare, in this respect, with any grounds of equal extent in the neighbourhood of New-York. Very respectfully,

S. O.

Steaming on Canals.

We noticed a few weeks since, that a model of a steamboat with the propelling power on the principle of sculling a boat, had been brought to this country from England, by Mr. Strickland, and also spoke of its application to canal boats and, perhaps, to our packet ships. It is perhaps, premature to speculate on the great revolution which the success of the experiments made in England, and the consequent adoption of steam power on canals, would occasion to canal navigation in this country; but from the following notice that we find in the Manchester Guardian, we presume that the annexed description of an experiment made by the Novelty, as she is called, through the canals between London and Manchester, at the rate of about seven miles an hour, will be interesting to our readers.—*U. S. Gazette.*

"An iron steamboat, built by Mr. John Laird, of North Birkenhead, (under the inspection of Mr. F. B. Ogden, the United States Consul at Liverpool,) and fitted with the sculling propellers, was launched on the 7th inst. She is at present waiting for her boilers, and it is expected will be tried on the Mersey in the couse of next week. She is intended to be worked as a steam-tug, to tow ships upon the Delaware and Raritan Canal, (New Jersey,) which was completed in 1834, and is 42 miles in length. Her machinery is said to be of a new and improved construction, and not a tenth part of the weight of the machinery in general use, of equal power."

"We have already stated, that the *Novelty* is the hull of an old canal boat. Her form, to those unacquanted with the build of these boats, will be understood when we state that her length is about seventy-four feet, with seven feet six inch beam; she is heavily constructed, and, when loaded, draws about two feet water. We noticed that her engine was high pressure and of four horses' power, supplied with steam from a small locomotive boiler. The boat is fitted with a species of paddles, already described, but perhaps better known as "Ericsson's propellers," in substitution of the side paddles, of the old steamers--which are constructed so as to propel, without raising a surge injurious to canal banks, and so as to pass through the narrow locks with ease and safety--objects hitherto unattained, and deemed impracticable. The main peculiarity of this invention is the construction of the paddle, so as to secure an action resembling that of a fish's tail, or of a perpetual sculling through the water. The difference between the operation of the propellers and that of the fish or double scull, is, that instead of the force being alternate from side to side, the propellers strokes upon the water are simultaneous. We before explained the construction of the paddle-boards, and the fact of their revolving in opposite directions. This is effected by the wheels or rings being fixed, one to a hollow shaft, and the other to a solid shaft, revolving within the hollow one; so that, although they move in opposite directions,

they turn upon the same centre; each opponent paddle-board striking the water at the same time. The power from the engine is communicated by a crank at the solid shaft; a cog-wheel attached to the crank shaft works in gear with another cog wheel immediately under it, and the reversed action of the other propellers is obtained by gearing and an endless chain. As these propellers work with the greatest effect when submerged, no waste of power is incurred, and no shaking motion communicated to the boat. When in motion, with her propellers submerged, there is little to distinguish the *Novelty* from other canal boats, the old wooden funnel being retained; there being little smoke, as coke is the fuel consumed; the engine and boiler being out of sight, and the only variation in her form being the elongation and widening of the stern, about 14 inches, with the addition of a slight stage for the helmsman.

Wooden Pavements.

The experiment of wooden pavement seems to have been fairly tried in this city. We regard the success which has attended the efforts in Walnut street below Third, and in Chesnut above Fourth, as conclusive of the adaptation of that species of pavement to city streets. Of the duration, positive and comparative, of wooden pavements, we of course are not yet enabled to speak, but we may say that in several streets of our city, stone pavements have exhibited strong evidences of needing repairs in less time than the wooden pavement has been in use.

That part of the Chesnut street wooden pavement nearest to Fifth street, was, we know, in a bad situation for a considerable time; but this arose, we believe, from a want of proper knowledge of the best mode of putting it down and especially for want of some drain for the water falling upon it and soaking through between the blocks. The whole was taken up, relaid with care, and a drain made for carrying off the water; but especially were there stone gutters laid between the blocks and the curb stones. We are not sure but we shall some day see the gutters of our streets formed of cast iron, the upper surface cast in such a way as to form a drain for the water. We must enquire into the probable expense of such substitution for stone. The business of *street* making is as yet but little understood, but we hope that in a few years some substitute for the present wretched pebble pavement and brick gutters will be generally adopted. At present we know of nothing that can exceed the hemlock or locust blocks, and stone or iron gutters; and we believe that, with a little foresight and care in procuring a supply of timber at the right season, the streets may be thus paved at about twenty per cent. more than the pebble covering costs. The difference in comfort and wear and tear to horse and carriage, may be guessed by those who occasionally ride by the United States Bank. The difference in neatness of appearance and cleanliness is obvious to any one.—*U. S. Gaz. Phila.*

Extract from a Letter, dated Crawfordville, Ga., August 13th.

The Georgia Railroad is in successful operation to this place. The passenger cars arriving regularly every day from Augusta, (Sundays excepted) at 10 o'clock, A. M., and departing at a quarter to 11 o'clock, A. M., reaching Augusta at 4 o'clock, P. M.

The motion of the Locomotive and cars on most of the road is exceedingly smooth and easy; the only annoyance is the dust raised from the road by the very rapid motion of the cars, approaching fre-

quently to near 30 miles an hour, and the black smoke of our pitch pine. There has scarcely anything happened that might bear the name of accident since operations commenced on the road.

There is but little doing in the way of freight at this season of the year, but we confidently look forward to a profitable business in that way when the new crop of cotton shall come in.

The road will certainly be completed to Greensboro, eighteen miles beyond this place, by Christmas next. Old Georgia, long incredulous, is at length wide awake to internal improvements.

We calculate on a good average crop of cotton, not more. The crop of corn good in many places. Wheat crop better this year than usual, &c.

J. E. M.

Philadelphia and Reading Railroad.—We have in preparation a full description of this very interesting Road, which reflects the greatest credit upon its proprietors and engineers. Meanwhile, we would point out this as a Road well worth visiting; both by those who are in search of professional information, and by those who seek health and pleasure. The scenery along the Schuylkill—the tunnel and beautiful bridge, but particularly the approach to Reading, are either of them well worth a visit. This should be a favourite trip, both to Philadelphians and strangers. The most excellent accommodations to travellers are provided.

Erie and Sunbury Railroad.—The different brigades of Engineers employed under the general supervision of Mr. Miller, as principal Engineer of the Sunbury and Erie Railroad, have been, ever since early in April, actively engaged in exploring a route for that important branch of internal improvement, in which Philadelphia has such a deep interest.—*U. S. Gaz.*

Important for Ladies.—The Boston Times says: "Mr. J. Cutts Smith, of this city, has invented a key for tuning Piano-Fortes, which promises to be of great utility, and will enable ladies to tune their own Pianos, without the trouble and expense of procuring a person especially for that purpose. It is very simple in its construction, and will probably soon take the place of the old key altogether."

We think this is something like a watch key to regulate watches, without the trouble, &c. &c.

Gas Works.—We have before us a handsome volume, containing reports of the trustees of the Philadelphia gas works to the councils, to which are added the reports of committees of councils prior to the establishment of the gas works, the report of S. N. Merrick, Esq. on the gas works of Europe, the ordinances of councils in relation to the works, the bye laws of the board, &c.—a valuable book of reference; and we may take occasion to say, that never was an undertaking carried on, from its commencement to its entire establishment, with greater success and fewer mistakes, than have marked the gas works of our city. The mission of Mr. Merrick to Europe was a most fortunate part of the work, and the results of his labors show him to have been a shrewd observer, as well as a skilful mechanic.—*U. S. Gazette*

We should like very much to see a copy of Mr. Merrick's Report. We are pleased to learn that our neighbours are doing the thing in the proper manner.

PATENT RAILROAD, SHIP AND BOAT SPIKES.

[illegible] Iron and Nail Factory keeps constantly on hand a very extensive assortment of Railroad Spikes and Nails, from 3 to 10 inches, manufactured by the subscriber's Patent Machinery, which has been years successful operation, and now almost exclusively in use in the United States, (as well as England, where the subscriber obtained a patent) are found superior to any yet ever offered in market.

Railroad companies may be supplied with Spikes, having countersunk heads suitable to the holes in iron rails, to any amount and on short notice. Almost all the Railroads now in progress in the United States are fastened with Spikes made at the above named factory—for which purpose they are found invaluable, as their adhesion is more than double that of common Spikes made by the hammer.

All orders directed to the Agent, Troy, N.Y. will be punctually attended to.

HENRY BURDEN, Agent.

Troy, N.Y., July, 1831.

☞ Spikes are kept for sale, at factory prices, by I & J. Townsend, Albany, and the principal Iron Merchants in Albany and Troy; J. I. Brower, 229 Water-street, New-York; A. M. Jones, Philadelphia; T. Ingersoll, Baltimore; Degrand & Smith, Boston.

P. S.—Railroad companies would do well to forward their orders as early as practicable, as the subscriber is desirous of extending the manufacturing as to keep pace with the daily increasing demand for his Spikes.

H. BURDEN.

TO CONTRACTORS FOR EXCAVATION AND MASONRY.

Philadelphia and Reading Railroad.

Proposals will be received at Herr's Hotel, in Reading, on the 13th day of September, (the ensuing month) until the hour of 6 P. M. for the grading of the heaviest sections of the Railroad between Reading and Fort Clinton, including a tunnel of sixteen hundred feet in length, in the neighborhood of Fort Clinton, and for the masonry generally on this portion of the Railroad.

The sections to be let are very heavy, some of them involving much rock excavation, and the Masonry consists of culverts of large opening, and heavy bridge abutments and piers.

Any further information in relation to the work will be given on application to Wm. Robinson, Acting Engineer, or the Assistant Engineers on the line, and maps and profiles of the line, and plans and specifications of the Masonry will be ready for examination at Reading, a week previous to the letting.

Persons unknown to the Engineers, will be required to hand in with their proposals satisfactory testimonials as to character and competency.

WM. ROBINSON, C. E.

Philadelphia, Aug. 14, 1838. 8 2t

PATENT SAFETY FUSE,

For Igniting the Charge in Blasting Rocks, both in dry places and under water.

To those acquainted with and accustomed to using the Fuse, comment or description is unnecessary; to those who are not, we would simply observe, that it is an important invention to persons employed or concerned in Blasting, as by its use that hitherto dangerous operation is rendered as *safe* as the ordinary employment is of the Farmer. It insures certainty, and effects an explosion as well under water as in the driest situation, adds much to the *force* of the blast, and by rendering the priming needle unnecessary, saves much time.

Numerous certificates from those who have tested the Fuse, might be given, but the following is deemed sufficient.

CERTIFICATE.

Having seen the Patent Safety Fuse for Blasting tested to our satisfaction, we cheerfully certify, that we are convinced that it saves much time and labor—adds to the force of the blast—ensures certainty, and renders blasting perfectly safe. Besides, it is we think, CHEAPER than the common straw Fuse. For dry blasting it is a great improvement; but for blasting in wet ground, it is invaluable. Messrs. P. Hitchins & Co., contractors on the Erie canal, certify that they have been engaged in the Cornish mines, England, where the Fuse is exclusively used, and that it has never to their knowledge, caused a miscarriage. They confirm our above expressed opinion of its value. We make no doubt that it will soon be in universal use in blasting operations.

DAVID HAMILTON,
Superintendent repairs, Erie Canal.
W. J. McALPINE,
Assistant Engineer Erie Canal Enlargement.
J. HOUGHTON,
Engineer Cohoes Company.

COHOES, December 16, 1837.

The Fuse is manufactured by Baron, Bickford, Eales and Co. at Simsbury, Hartford Co., Conn., orders directed to them, or either of their agents, will be promptly attended to.

Agents for selling the Patent Safety Fuse.

David Watkinson & Co., Hartford, Conn.
A. G. Hazard & Co., 135 Front-st., N. Y.
Erastus Corning & Co., 361 South Market-street, Albany, N. Y.
E. F. & A. G. Smith, 29 Exchange-street, Rochester, N. Y.
H. Kingman & Co., Buffalo, N. Y.
Curtis & Hand, 16 Commerce street Philadelphia, Penn.
Pratt & Keith, South Charles-street, Baltimore, MD.
G. R. Peske, Richmond Va.
W. B. Peske, Fredericksburgh, Va.

SHEET LEAD, &c.

THE Subscribers, Manufacturers of Sheet Lead, Lead Pipe, Red Lead and Litharge—have always an assortment in store, and for sale, at 175 Front Street, corner of Burling Slip.

CORNELL & TUCKER.

☞ Sheet Lead and Lead Pipe for Fortifications and Engineering, Milled any thickness and size to order.

New-York, March 10, 1838. 3m

ENLARGEMENT OF THE ERIE CANAL.

NOTICE.—First. Sealed proposals will be received by the Canal Commissioners, until 5 o'clock P. M on the 25th day of September next, for enlarging 21-2 miles of Canal Sections No. 1, 2, 3, 4, and 5, extending through the rock on Mountain Ridge, commencing near the head of the present Locks in the village of Lockport, together with all the Bridges, except Main Street Bridge, on the same.

Second. Proposals will also be received at the same time for enlarging Section No. 1, on the Genesee Level, commencing near the foot of the present locks, together with all the Bridges, Waste-Weirs and Culverts on the same.

Third. Proposals will also be received at the same time for constructing five sets of Double and combined Locks in the village of Lockport, together with the enlargement of the Race and the necessary Gates along the south side of the Locks, to pass the water from the upper to the lower level.

Fourth. Proposals will also be received at the same time for extending the length of the Tonawanda Dam, in the village of Tonawanda. Also, for repairing the present Dam, with the necessary abutments and protecting walls, and to construct an embankment, commencing at the village of Tonawanda, about 4 miles along the south side of Ellicot creek, together with the Docking on the same.

Fifth. Proposals will also be received at the same time for cutting a ditch from Mill Creek, near Tonawanda village, to a point a short distance above the Change Bridge in said village; together with the Bridges and Sluices on the same, and a wooden trunk Culvert under the Erie Canal, at the Niagara River.

The prices of work must include the expense of materials necessary for the completion of the same, according to the Plans and Specifications that will be presented at the time of receiving proposals.

The work in the first and second specifications, is to be completed by the first day of April, 1841.

That in the third specification, to be completed by the first day of March, 1843.

The work in the fourth and fifth specifications to be completed by the first day of October, 1839.

But the Culverts, Bridges and Wasteweirs, in the first and second specifications, to be completed by the first day of September, 1840.

The north tier of Locks in the third specification to be completed by the first day of March, 1841.

Security will be required for the performance of the contracts, and the propositions should be accompanied by the names of responsible persons, signifying their assent to become sureties. If the character and responsibility of those proposing, and the sureties they shall offer, are not known to the undersigned, or the Chief Engineer, a certificate of good character, and the extent of their responsibility, signed by the first Judge or Clerk of the county in which they severally reside, will be required.—The locations of the different works, and the plans of the several structures, with the specifications of the kind of materials and manner of construction, will be ready for examination by the tenth day of September next, at the Engineer's Office in the village of Lockport, and at Thompson's Tavern in the village of Tonawanda; at which time and places, the Chief or Assistant Engineers will be in attendance, to explain plans, &c., and to furnish blank propositions. The undersigned will attend in the village of Lockport on the twenty-fourth day of September next.

The party to the propositions which may be accepted, will be required to enter into contracts immediately after the acceptance of the same.

The undersigned reserve to themselves the right to accept proposals for the whole, or any part of the above work.

Persons proposing for more work than they wish to contract for, must specify the quantity they desire to take.

The full names of all persons who are parties to any proposition, must be written out in the signatures for the same.

The prices, for the excavation and embankment, will be considered as including the expense of shaping and trimming the banks.

No transfer of Contracts will be recognised.

WM. C. BOUCK,
JONAS EARL, Jr. } Acting Canal
JOHN BOWMAN, } Commissioners,
WM. BAKER.

Lockport, 25th August, 1838. 5 2t

AVERY'S ROTARY ENGINE.

This Engine is now in use in various parts of the country, and is found to possess important advantages, as a driving power, for *Saw-Mills, Flouring Mills, Cotton Factories, Sugar Mills* and *Machine Shops*, over the ordinary Piston Engine.

Its advantage consists in economy in the *first cost*, and also in the cost of *fuel, repairs*, and *attendance*. Wherever one of them has been put in operation by a person acquainted with them, others have been ordered, and it will continue to be so wherever they may become known.

Orders for Engines, and Mill Machinery addressed to this office, or to Mr. Joseph Curtis, 71 Attorney street, will be promptly attended to.

D. K. MINOR, Agent. tf

LONG ISLAND RAILROAD.

Will be issued from this Office in a few days, in pamphlet form, with Lithographed Illustrations; a full description of the Long Island Railroad, by an Engineer—which it is designed to make the commencement of a series of pamphlets—if Engineers can be induced to prepare them—giving full and complete descriptions of the different Railroads and Canals in the United States, which are, and as others may be hereafter completed. 5tf

PRESERVATION OF TIMBER.

THE PROPRIETORS of the invention of the late Robert Bill, of London, by which Wood may be saturated throughout with a Composition which has been found an efficient preservative against ordinary decay, the dry rot, and the gribble worm, having made such improvements thereon as have rendered the process more simple and efficient, are prepared to enter into contracts for the preparation of timber, and to dispose of the right of using the patent process.

The method in question is believed to afford a complete protection to wood, even in the most exposed and disadvantageous positions, at a less cost than any other which has yet been proposed. It is applicable to every case in which timber is employed; and is particularly worthy of attention in the blocks with which streets are paved, the rails and sleepers of railroads, the frames and planking of the gates of canal locks, the timber used in building docks and wharves, when the ravages of the worm are to be feared, and the piles and the beams used in every species of hydraulic construction. The details of the process may be learned, and terms made known, on application to

JAMES TREAT,
General Agent of the Proprietors,
No. 4, Wall st. New York.

Certificates.

I have witnessed a number of the experimental operations, made for the purpose of testing the practicability of Robert Bill's process for the preservation of timber. In these it was shown, that by the addition of improvements to the original method, the perfect seasoning of timber, by the separation both of its sap and accombined moisture, could be effected: that almost every description of wood on which experiment was made, was thoroughly saturated with the protecting material; and that in the single instance, (hemlock,) through whose pores the injection was not complete, enough was done to exclude all access of moisture. The proprietors have certificates of the exposure of wood, prepared by Bill's method to the most severe trials, for a space of five years; but were not this proof in their possession, it would be clear, from the high antiseptic properties of the material they employ, that wood, fully saturated with it, cannot be subject to any of the ordinary causes of decay. The power of the same material to repel the gribble worm is universally admitted, even when merely applied as a coating; but when injected throughout, it must act as a perfect protection.

Columbia College, N. Y. May 25, 1838.

JAMES RENWICK, LL.D.
Professor of Natural and Experimental Philosophy and Chemistry.

Certificate given by the British Government to Robert Bill.

"Timber prepared by Mr. Robert Bill was put into the dry rot pit in his Majesty's yard, Woolwich, where it remained for five years, and perfectly withstood the fungus rot, whilst numerous other specimens were destroyed in a fifth part of that time. Other pieces were placed in the sea, by the master shipwright at Sheerness; and while wood, considered impervious to the gribble worm, was nearly eaten up, those remained untouched. Some specimens of timber, so prepared were placed in the earth at his Majesty's yard, Deptford one half their length being buried, and the other half protruding above ground, and pieces cut from the same tree, but unprepared, were put in competition with them; at the end of five years the former remained unchanged, the latter entirely destroyed. These experiments prove that the inferior sorts of timber may be made, at a small expense, far more durable than oak, or perhaps any known wood, from which great national benefits may be derived.

JOHN KNOWLES,
Secretary of the Navy Board.

GENEVA, N. Y. 15th June, 1838.

Having seen several specimens of Wood saturated with Coal Tar (so called,) and believing its use would greatly tend to the preservation from decay of all exposed timber, in structures for Railroads, Bridges or Canals, I recommend its adoption, and believe said wood would prove to be one of the greatest elements of economy that has ever been introduced into works where timber forms a chief material.

J. G. SWIFT,
Late of the U. S. Army

LOCOMOTIVE ENGINES.

The subscribers have for sale in England, on account of whom it may concern:

Two very superior light locomotive engines with tenders, &c. complete. These engines are suitable for roads, the superstructure of which are of wood with flat bars. They are of HURY's celebrated pattern, and would no doubt give great satisfaction:

ALSO—

Two 6 wheel engines of 11 tons weight, with fuel and water. These engines are of very superior workmanship. One of them could be delivered at New York, and the other in Philadelphia;

ALSO—

Two 4 wheel engines, warranted by the manufacturers not to weigh more than 7½ tons, with fuel and water. These engines are of a lot of 8 made at one establishment, of a particular pattern. Some of them are now running, and give very great satisfaction.

A. & G. RALSTON & CO.
South Front st. Philadelphia.

Who have on hand 800 tons of T rails, 2½ by 5-8, 2 by ½, 1¼ by ½, 1 1-4 by 1-4 and 1 by 1-4 flat bar rail road iron. Also Rims for Locomotives, cars, &c. &c. Orders for rail road iron executed as usual.

3 2m

TO SUBSCRIBERS.

In consequence of the suspension, for several months, of its publication, the present, or *Seventh* volume, will be commenced on the 1st of July—*instead* of January, 1838: and the work will hereafter form *two* volumes each year.

*** The MECHANICS' MAGAZINE, heretofore published as a separate work, will from this date be united with the Railroad Journal, and the publication will hereafter bear the title of *Railroad Journal and Mechanics' Magazine*, and be forwarded to those who have paid for the *Mechanics' Magazine* to a period subsequent to *July* 2.1837, until they shall have received as many months of *this*, as they paid for *that* work—or until otherwise ordered, if paid for in advance.

The terms are Five Dollars per annum, *in advance*.

THE NEWCASTLE MANUFACTURING COMPANY

Continue to furnish at the works situated in the town of Newcastle, Delaware, *Locomotive and other Steam Engines*—Jack Screws, Wrought-iron work and Brass and Iron Castings, of all kinds connected with Steamboats, Railroads, &c. Mill Gearing of every description; Cast Wheels (chilled) of any pattern and size, with axles fitted, also with wrought Tires; Springs, Boxes and Bolts for Cars; Driving and other Wheels for Locomotives.

The works being on an extensive Scale, all orders will be executed with promptness and dispatch. Communications addressed to Mr. William H. Dobb, Superintendent, will meet with immediate attention. ANDREW C. GRAY,

President of the Newcastle Manufact'g Co.

Newcastle, Del. March 6, 1838. 1y.

NOTICE TO RAILROAD CONTRACTORS.

Western and Atlantic Railroad of the State of Georgia.

In addition to the 50 miles of this railroad farmed out for construction in April last, the grading and masonry on another equal portion of the same work, is now offered for contract.

SEALED PROPOSALS

Therefor, will accordingly be received at the office of the board of commissioners in Cassville, Cass county, Georgia, between the eighth and thirteenth of October next, during which time, engineers will be in attendance on the line of the road to point out the localities, and explain by the aid of plans and profiles of the route, the nature and extent of the work to be done.

This portion of the route traverses a limestone region, abounding in springs, and streams of fine water. The climate of the country is mild and salubrious. The frosts of winter are never so severe as to prevent easy and successful grading even in the most inclement part of that season.

The time for the fulfilment of contracts will be amply sufficient for this purpose.—This and all other conditions relating thereto, will be exhibited in printed proposals and articles of agreement, blank copies of which will be in readiness for inspection, filling and signature, at the time and place above designated.

Credentials setting forth the character and competency of the contractors unknown to the commissioners will be required.

By order of the board of Commissioners.

S. H. LONG, Ch'f Eng'r.

Office of the W. & A. R. R.

Marietta, July 12, 1838. 4 4t

NEW ARRANGEMENT.

ROPES FOR INCLINED PLANES OF RAILROADS.

WE the subscribers have formed a co partnership under the style and firm of Folger & Coleman, for the manufacturing and selling of Ropes for inclined planes of railroads, and for other uses, offer to supply ropes for inclined planes, of any length required without splice, at short notice, the manufacturing of cordage, heretofore carried on by S. S. Durfee & Co., will be done by the new firm, the same superintendent and machinery are employed by the new firm that were employed by S. S. Durfee & Co. All orders will be properly attended to, and ropes will be shipped to any port in the United States.

12th month 12th, 1836. Hudson, Columbia County, State of New-York.

ROBT. C. FOLGER.

33—tf GEORGE COLEMAN.

List of Payments since our last Number.

John Hampson, New Orleans,	to July 1.	1839.
J. F. Miller, Fultonville, N. Y.	" "	"
Engineers' Office of the L. C. & C. Railroad, Charleston S.C.	" "	"
Mary & Ward, Albany, N. Y.	Feb. 13,	1838.
W. V. Many, " "	July 1,	1839.
Wm. Pollock, Tremont, Ill.	" "	"
E. A. Douglass, Wilkesbarre, Pa.	June "	"
J. E. Mercer, Crawfordsville, Ga.	July "	"
F. L. Dancy, St. Augustine,	" "	"
T. J. Craw, York Pa.	" "	"
I. C. Cabell, Warminster, Va.	" "	"
Goodhue & Co. N. Y.	" "	"
Major Bach, Philadelphia,	Jan. 1,	1838.
A. R. Johnston, Fort Leavenworth,	July "	1839.
Frederick Harback, Warren, Mass.	" "	"
J. Adams, Thompson, Ct.	Jan. "	"
Edward S. Tod, Memphis, Ten.	" "	1840.